The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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The Chicago's Guns.

At the Midvale Steel Works, Nicetown, Philadelphia, there are being manufactured eight 6-inch and two 5-inch all-steel breech-loading rifles intended for use on the new naval cruiser Chicago, now in course of construction at Chester. The designs of the guns have been furnished by the Bureau of Ordnance, and embody the general principles of the Vavasseur system. They consist of a tube, a jacket and superimposed cylinders or hoops shrunk on. For this reason they are usually called built-up or hooped guns. The bore is 30 calibers in length, with an enlarged chamber. The 6-inch guns will be 1 inch over 16 feet in length, and will weigh 10,000 pounds each. Fifty pounds of powder will be used in one charge, which is calculated to hurl a projectile weighing 100 pounds. The Chicago will also be provided with four 8-inch guns. The Navy Department found it necessary to import the steel for the tubes and jackets of these 8-inch guns, as no concern in this country would undertake the manufacture of the steel, owing to the lack of proper appliances. Some of the minor parts, however, of the 8-inch guns are being made at the Midvale Steel Works. The work done at the latter place for the 5 and 6 inch guns comprises the production of the steel, oil tempering and the forging of the guns. The machine finishing is done at the Washington Navy Yard, where also the parts are put together. The metal used is open-hearth steel. Before the parts are accepted by the Government, a number of specimens are cut from each piece and sent to Washington for testing. Ninety specimen bars were broken before the material for the first 6-inch gun was accepted.

One 6-inch gun has been completed, and is now being tested at the Naval Experimental Battery, Annapolis, Md. It will probably be placed on board the Dolphin. It is the first high-power all-steel gun ever manufactured in this country entirely from American material. A 6-inch rifle, somewhat shorter, had previously been manufactured by the South Boston Iron Company, but the jacket was of imported steel. At the latest accounts the powder best adapted to the size and shape of the chamber of the gun at Annapolis had not been obtained. The trials, however, showed good results. With a charge of 45 pounds of powder a 100-pound projectile obtained 1910 feet initial volocity, the pressure being 16 tons to the square inch. With the proper powder it is expected the initial velocity will reach a point above 2000 feet, though the pressure will probably increase to 18 tons. This will still leave a large margin of safety.

Convict Labor in Georgia.—The statement is made from Atlanta that, under the laws of Georgia, prisoners convicted of felonies are leased by the State to various parties, who employ their labor in coal mines, on the construction of railroads, roads and in many other ways. Capt. W. D. Grant, one of the largest lessees in the State, who had nearly 300 convicts, recently sold out his rights under the lease to a party of gentlemen, one of whom is United States Senator Joseph E. Brown. Of the convicts, about 75 fell to the lot of Senator Brown, who is largely interested in North Georgia coal mines, in connection with which he runs several furnaces. A day or two ago notices were posted at the iron works of the Rising Fawn Furnace to the effect that in a few days the free laborers would be relieved from employment and their places supplied by the convicts. To this brief notification the free laborers have taken bitter exception, and are in a state of excited discontent. Some of them are much enraged, and are said to be counseling resistance by force to the work of supplanting them with felons. They are reported to have sent a protest to Senator Brown, detailing their grievances, and are awaiting his reply. If the answer is not favorable, and the convicts are sent to take the places of free laborers, the latter will, it is feared, use force and attempt to overpower the guards and free the convicts.

A recent issue of London *Truth* says: "Messrs. John Elder & Co. are pushing on rapidly with the two large Cunarders they are building for Mr. John Burns. These vessels are expected to beat any vessel afloat, and have engines far larger than any hitherto built, one single crank weighing no less than 27 tons; the boilers will have 72 furnaces, and the speed is expected to eclipse even that of the Oregon.

A German Vertical Rolling-Mill Engine.

We present in the accompanying engravings, taken from the last issue of *Stahl und Eisen*, general and detail views of a vertical rolling-mill engine built by the Maschinenbau-Actien-Gesellschaft Union, of Essen, Germany, and which, we think, will be found interesting as examples of current German practice in this particular line. The automatic cut-off gear shown was put on an old engine in the works of Messrs. Grille, Funke & Co., of Schalke, Germany, some years since, with a view of securing better economy in steam consumption, and the results subsequently obtained were found to be eminently satisfactory. The conditions imposed by the owners of the old engine were very exacting, and among other requirements it was desired that the speed under different conditions of loading should not vary from the normal speed of 57 revolutions per minute by more than two revolutions. The cylinder of the engine, as

(*Continued on page 7.*)

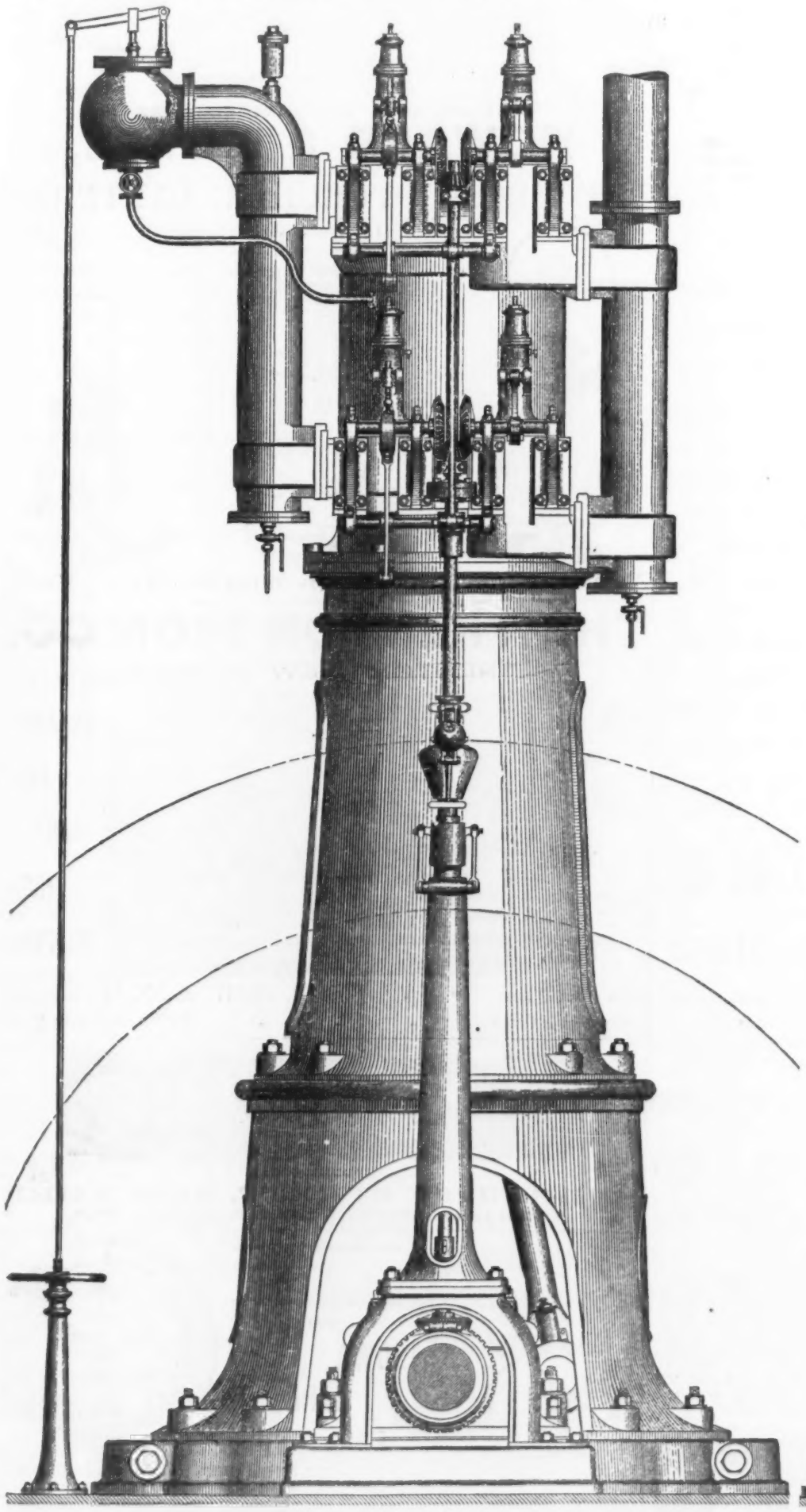

Fig. 1.—Side Elevation.

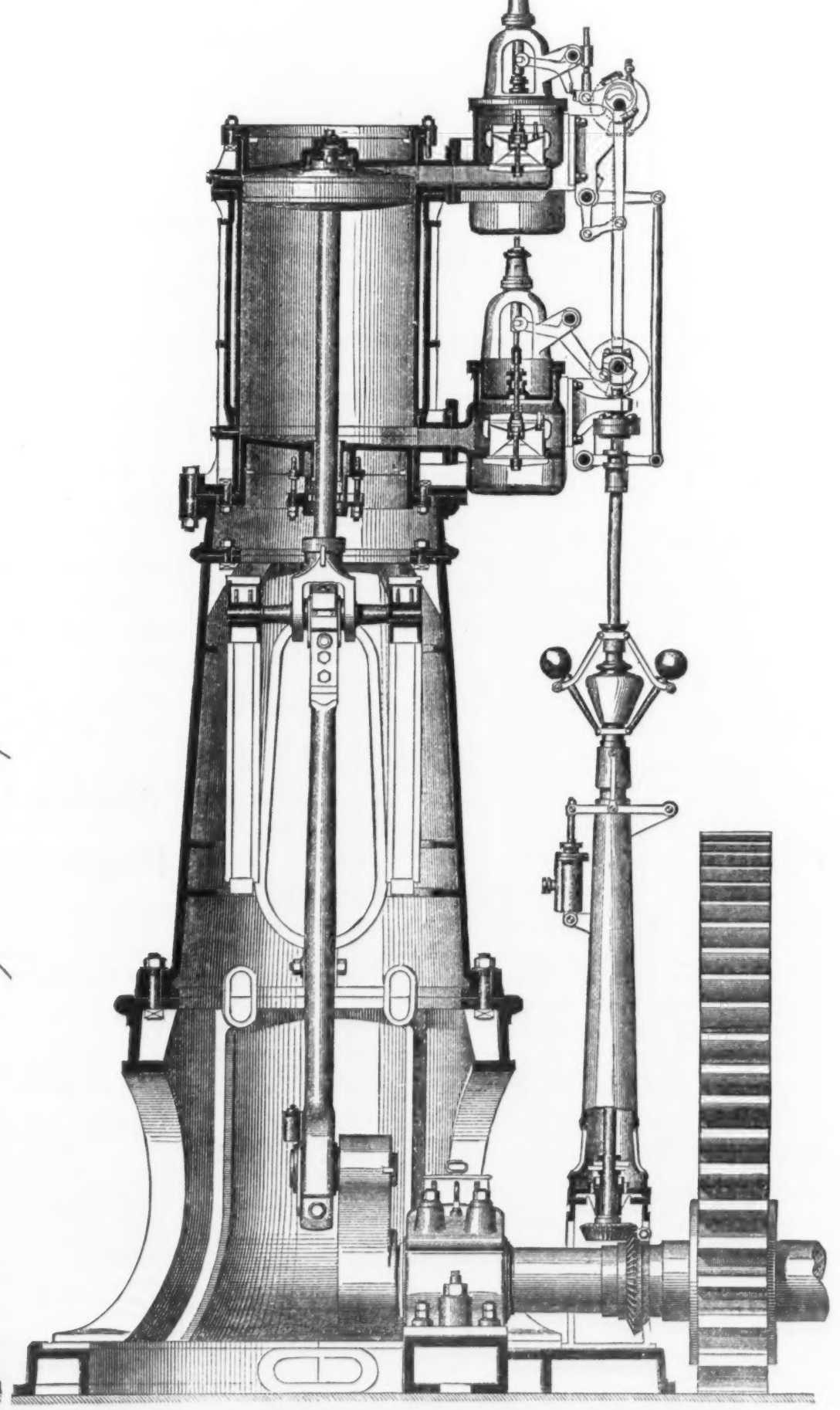

Fig. 2.—Vertical Section.

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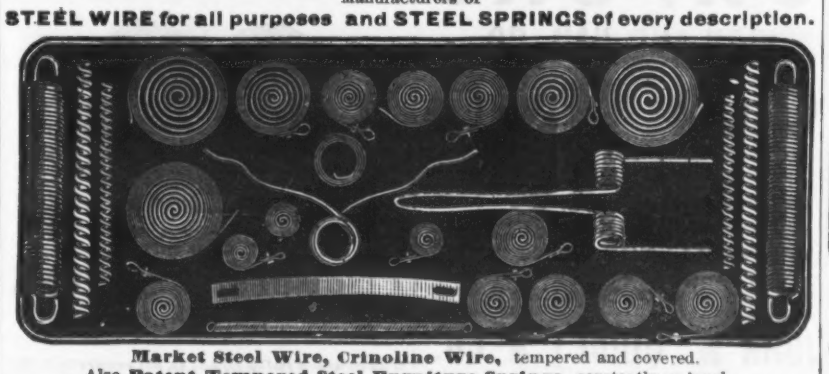

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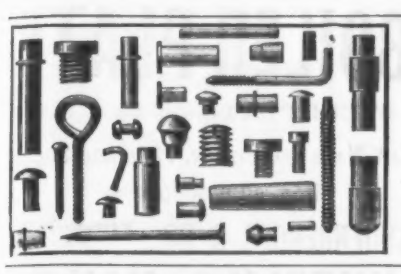

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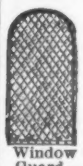
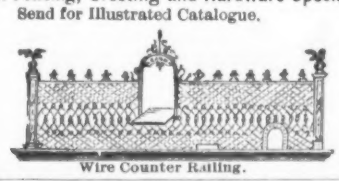

Window Guard.


Sand Screen.


Sand and Grain Riddle.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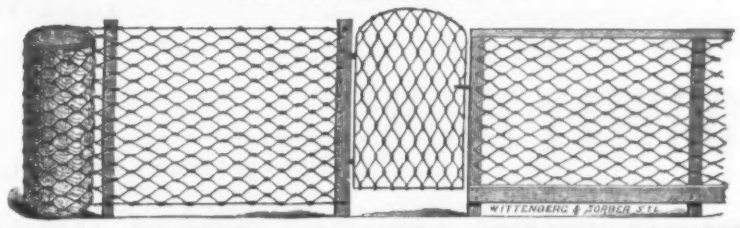

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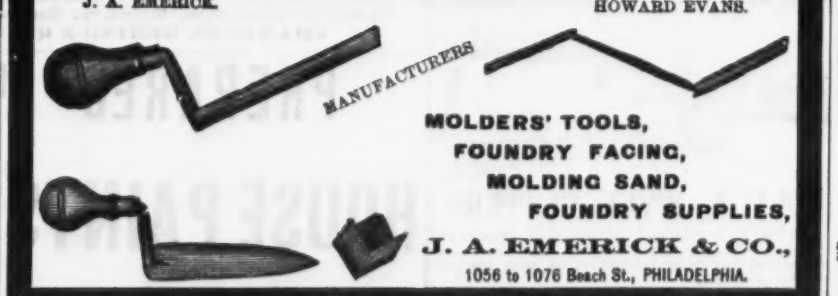

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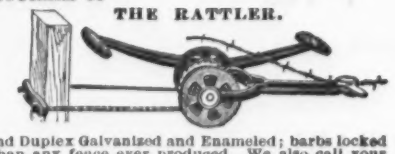

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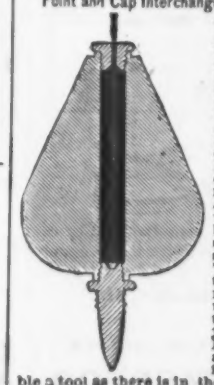

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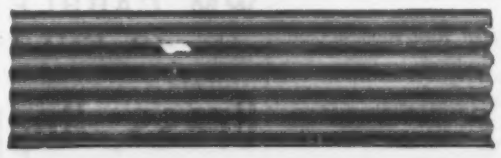

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The Cleveland Bessemer Steel Works.

At a recent meeting of the Civil Engineers' Club, of Cleveland, Ohio, President J. F. Holloway read an interesting paper on the history of the Bessemer steel process, from which we take the following description of the early days of pneumatic steel-making in Cleveland:

Eighteen years ago, in company with A. B. Stone, then president of the Cleveland Rolling Mill Company, I visited Troy to examine the only Bessemer steel plant then in the United States. The Cleveland Rolling Mill Company had decided to build a steel works in Newburgh, under the Bessemer license. They employed as the constructing engineer Herr Gemlin, a German engineer of marked ability, who had lived in England for a short time, and had made the process a study at Mr. Bessemer's works. The Cuyahoga Works of this city, with which I was then, as now, connected, undertook to furnish the necessary blowing engines, steam boilers, hydraulic cranes and other machinery, and it is a matter of congratulation to all concerned to be able to say that no steel works built before or since, of the same size and capacity, have equaled the Bessemer steel plant at Newburgh in the quantity of steel produced The works were completed and were ready for trial by September 6, 1868. As there was at that time no one in this country who had had any experience in making steel by this process, the Rolling Mill Company brought from England two men who had worked at Chas. Cammels & Co., Sheffield, England, to superintend the blowing. Whether it was owing to the difference in the iron, as compared with what they had been accustomed to or not, I cannot say, but for some reason the first "blow" was a miss. The making of steel by the Bessemer process was at that time an experiment, at least in this country, and it claimed results so widely different from what had been done previously that it had awakened a great deal of interest among engineers and iron and steel makers. Inasmuch as I had never witnessed the operation, I took careful note of every movement, and made memoranda of the same at the time, and I find by referring to them now the following:

Sept. 6, 1868.—Began to charge the air-furnace with 4 tons of pig iron, being a mixture of Tilden, Fayette Brown and Hanging Rock charcoal iron.

The first pig went in at 1.15 p. m., and at 1.25 all the metal was in the furnace, the blowing engine running slowly to heat up the converter.

At 3.30 the spiegel furnace was charged with 700 pounds of German spiegel.

4.34, air-furnace tapped, and at 4.35 the metal was all in the converter.

Blast turned on, and vessel turned up at 4.39. Engine was running 30 revolutions per minute, air pressure 25 pounds, steam pressure 70 pounds.

At 4.53 slowed the engines and dropped the blast to 15 pounds, and at 5.28, after a blow of 49 minutes, the vessel was turned down and the blast shut off.

5.30, the spiegel furnace was tapped, and the metal from it run into the converter.

At 5.35 the 15 ingot molds had all been poured full; about as much more had been run into the pit, and the ladle was not yet empty.

The whole affair, while being a most magnificent display, was also a profound mystery as well, and the greatest puzzle of all was as to how it happened that there was so much more metal after the blow than before; but as no one but the two Englishmen knew anything about it, and as those two imported blowers were exceedingly reticent, I came away as much puzzled as ever. The next day, on making inquiry as to the quality of the steel produced, I was informed that on examination of the ingots, after they had cooled down, it was found that there was not a single pound of iron or steel to be found anywhere; the metal had been so tremendously overblown that it had all been burned to a cinder. The two Englishmen in charge of the blowing soon became familiar with the metal and plant, and produced very good steel; but for some reason they did not remain long, and after their return to England another event happened which was also a puzzle to me—which was that a man whom we had in our employ as a machinist, and who assisted in setting up the blowing engine, and had remained to run it, and a farmer living in the vicinity, were selected to blow the steel in their places; and up to a very recent date, if not now, they are still doing it. The immense quantity of steel turned out at the Newburgh works was made under the direction and charge of two men who never before in their lives had seen the inside of a steel or iron works of any kind.

As an illustration of the wonderful increase in the quantity of steel produced in later years at Newburgh, as compared with what all the steel works in England were also doing at that time, I have recently obtained some data that will be interesting. The Newburgh plant then consisted of two 5-ton converters. After the works had been running some time, they succeeded in getting five "blows" in 12 hours; and if by any fortunate combination of circumstances they at any time managed to get an extra "blow" in, the workmen immediately employed their remaining breath in blowing the foam from a keg of beer, with which it was usual to celebrate so extraordinary an event. Of late years, owing in part to improvements made in various details, and in the more rapid handling of the material, as well as to the care taken to prevent any delays due to the workings of the vast machinery employed—which, I may say, has been under the able supervision of our member, Mr. E. H. Martin, for many years—and perhaps more than all else to the wonderful energy, push and *esprit de corps* infused into all departments by that remakable manager, the late Henry Chisholm, the product of this very same plant of two 5-ton converters has been made to yield 65, and sometimes as high as 79 "blows," in 24 hours, each of which converted 8 tons of iron into steel, thus, as will be seen, increasing the output of steel from 25 tons in 12 hours to 520 or more tons in 24 hours; and, what is most remarkable, whole years have passed in which from January 1 to December 31 not a single heat has been lost owing to any accident or failure of the machinery.

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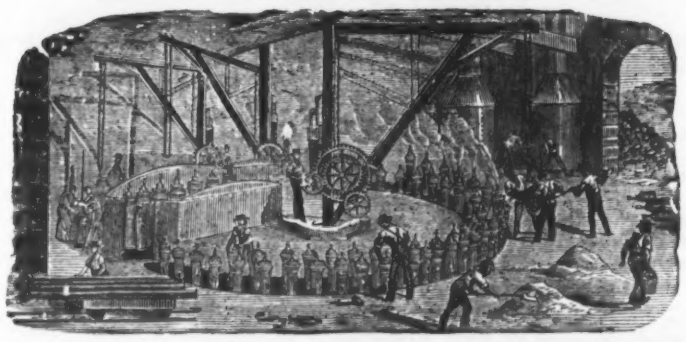

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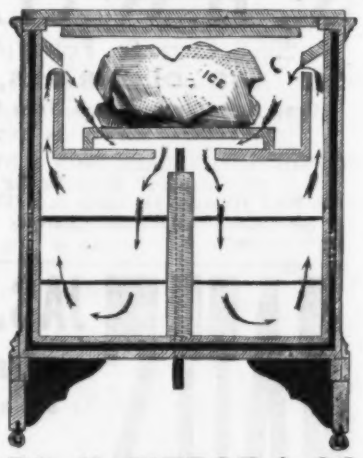

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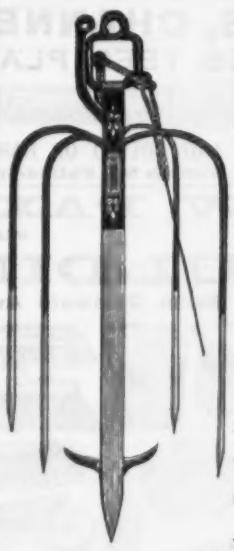

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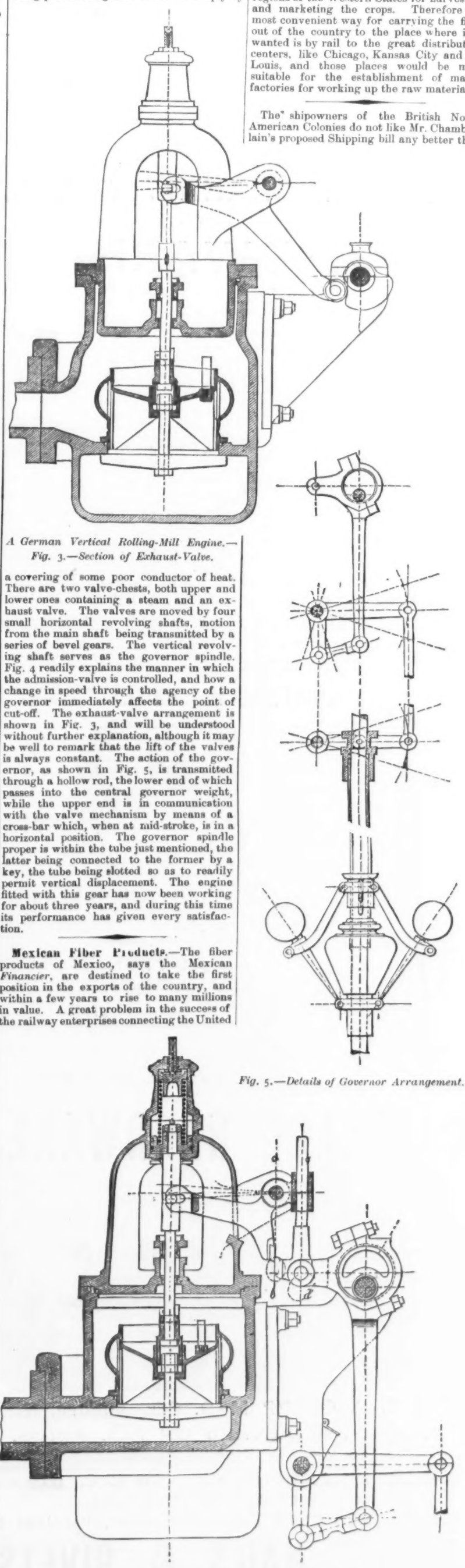
(Continued from page 1.)

shown in the vertical section on first page, is steam-jacketed, the cylinder heads, however, being protected against radiation simply by a covering of some poor conductor of heat. There are two valve-chests, both upper and lower ones containing a steam and an exhaust valve. The valves are moved by four small horizontal revolving shafts, motion from the main shaft being transmitted by a series of bevel gears. The vertical revolving shaft serves as the governor spindle. Fig. 4 readily explains the manner in which the admission-valve is controlled, and how a change in speed through the agency of the governor immediately affects the point of cut-off. The exhaust-valve arrangement is shown in Fig. 3, and will be understood without further explanation, although it may be well to remark that the lift of the valves is always constant. The action of the governor, as shown in Fig. 5, is transmitted through a hollow rod, the lower end of which passes into the central governor weight, while the upper end is in communication with the valve mechanism by means of a cross-bar which, when at mid-stroke, is in a horizontal position. The governor spindle proper is within the tube just mentioned, the latter being connected to the former by a key, the tube being slotted so as to readily permit vertical displacement. The engine fitted with this gear has now been working for about three years, and during this time its performance has given every satisfaction.



A German Vertical Rolling-Mill Engine.—Fig. 3.—Section of Exhaust-Valve.

Fig. 5.—Details of Governor Arrangement.

Fig. 4.—Section and Enlarged View of Steam-Valve.

Mexican Fiber Products.—The fiber products of Mexico, says the Mexican *Financier*, are destined to take the first position in the exports of the country, and within a few years to rise to many millions in value. A great problem in the success of the railway enterprises connecting the United States with Mexico has been the matter of return freights; not what they should bring into the country, but what they should take out. The fiber products will go a long way toward the solution of this question. The maguey fiber will go to the United States almost entirely by rail, for it is produced on the Central Table-land, and the twine and bagging manufactured from it are for the greater part used in the great grain-growing regions of the Western States for harvesting and marketing the crops. Therefore the most convenient way for carrying the fiber out of the country to the place where it is wanted is by rail to the great distributing centers, like Chicago, Kansas City and St. Louis, and those places would be most suitable for the establishment of manufactories for working up the raw material.

The shipowners of the British North American Colonies do not like Mr. Chamberlain's proposed Shipping bill any better than the members of their craft at home. It is stated that the New Brunswick shipowners will ask the Dominion Government to petition the imperial authorities to exempt Colonial shipping from the operation of the Merchant Shipping bill.

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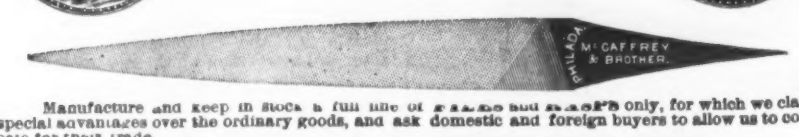

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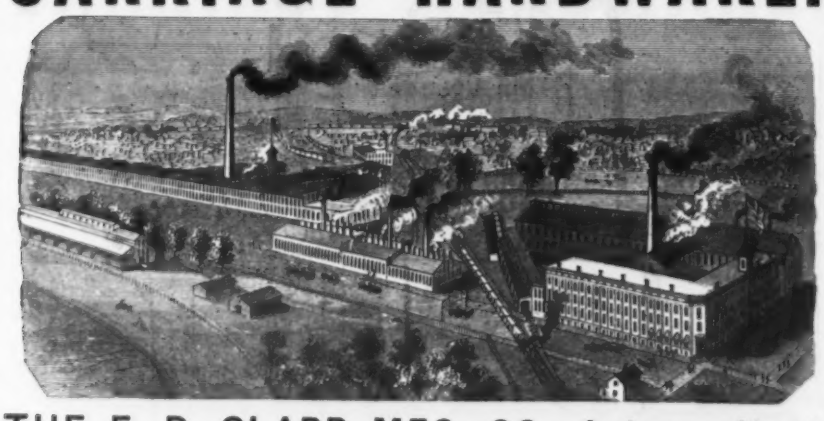

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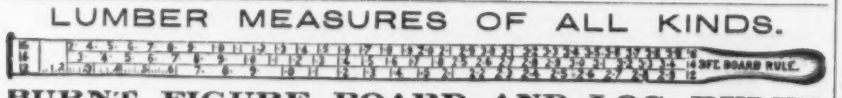

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Ginsaw,
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Half-Round,
Half-Round Wood,
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Hand Equaling,
Handsaw Blunt,
Handsaw (Double-Ender),
Handsaw Taper, single-cut,
Handsaw Taper, double-cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
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Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
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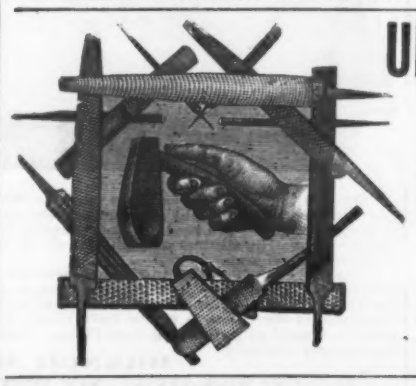

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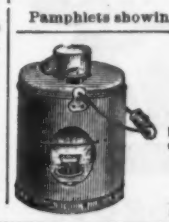

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Early History of the Steam Engine.*

(Concluded.)

The growth of the steam engine does not end with Watt, but time would fail me to point it out. To tell you of the work of Hornblower and Cartwright and Murray; Trevithick and Vivian; Oliver Evans, Fitch, Stevens and Fulton; of Maudslay and Woolf and of Stevenson. To speak of expansion and steam jackets and surface condensers; of high-pressure and double cylinders; of rotary and oscillating and trunk engines; of paddle and screws and of locomotives. The simple enumeration must suffice to show that much has been done since the days of Watt. I need not point out to you the enormous development which 50 odd years have seen. You can see it for yourselves on every hand—and the end is not yet. If the achievements of the past are any augury for the future, that future is to be a grand one.

Let us look at the past. The engine of Savery gave only $\frac{5}{10}$ of 1 per cent. of the power inherent in the coal as useful effect. Then came Newcomen and his followers, who raised it to 1½ per cent., and then Watt and his followers, who have raised it to 4, 5, 6, 7, 8 and even 9 and 10 per cent. Here is a a steady growth, which speaks well for the future. It is not the place here to point out the directions in which further improvement is to be sought. Suffice it to say that there is still room for improvement, and that time will surely bring it in the future.

What has the past done for us? The total power of all the steam engines now in existence has been estimated at about 20,000,000 horse-power. The data for an exact estimate are not procurable, but this is probably not far from the truth. Some idea of the enormous power thus placed at the disposal of man, working for him day and night that he may have rest and comfort, may perhaps be obtained by a comparison or two.

The Falls of Niagara are, say, 150 feet high, and each hour, upon a rough estimate, 1,165,000,000 cubic feet of water fall over. The power of the falls, then, exclusive of the velocity with which the water arrives at the brink, is about 5,000,000 horse-power, or about one-fourth of the entire steam-power of the earth. Four such falls as Niagara, working day and night, would be required to replace the work now done for man by the steam engine!

Again, if we take the fall of the river above the falls at 200 feet, then the entire power of the river to the foot of the falls is about three-fifths of the total amount of steam power which is placed daily at our disposal. Mighty and awe-inspiring as are the falls, the power wielded by man compares favorably even with their might; the hum of industry over the land is the audible expression of a power as great as that which finds expression in the roar of the falls themselves.

Again, the entire population of the globe is, say, 1,200,000,000. Let us assume that one-tenth of these are able-bodied manual laborers, and let each work 12 hours daily. Then, taking six men to a horse-power, we have just 20,000,000. That is, the total steam power now on the earth equals the work of all the workingmen upon it. The steam engine thus literally doubles the working population of the globe. With the same number of mouths to be fed, we have by its aid double the number of hands with which to earn our food. Each man has literally four hands with which to earn his bread.

Comparisons such as these enable us to realize in some small degree the immense influence of the steam engine upon the civilization of the world—an influence compared with which all the other inventions of man sink into insignificance. It is, as we have seen, the legitimate outcome of modern scientific methods, the result of systematic and intelligent study of nature's laws. It is, moreover, the utilization of one only of the many forms of power by which we are surrounded, and which still remain to be tamed by man and pressed into his service. When these forces are also subjugated, who can forsee the result! Have any of you ever thought how tremendous these forces are!

Take the force of gravitation, for instance. We all know it is this force which keeps the earth and planets in their orbits, the invisible but potent cord which binds together the members of our system. We have heard the fact stated so often that it is an old story, and we accept it without any further thought. But consider for a moment how great this force must be!

A bar of steel ¼ inch square can sustain a weight of about 7500 pounds, or the weight of 50 full-grown men. Now, simply to hold the moon in its orbit, we should have to have a colossal bar of steel, stretching from the earth far out to the moon, whose section would be 87,500 square miles. As large as the whole State of New York, with 536 miles over for good measure. Or if, instead of one single huge bar, we should stretch a forest of steel bars, each bar ¼ inch square, from the earth to the moon, we would have to cover the entire surface of the earth on the side toward the moon with such bars at intervals of only 6 inches. Think of it! A forest of steel, whose stems would be so close together that a cat could scarcely squeeze through. This is what the "force of gravitation" means.

Take another illustration of the mighty forces amid which we live so securely and so unconsciously. The mean rainfall on the earth may be taken at, say, 5 feet; the mean hight of fall at about 900 feet. We have, then, the average power of the rainfall per square mile, about 445 horse-power. The work performed, then, by the sun's rays, in simply raising our yearly rain supply, without which all life would perish utterly, is 87,630,000 horse-power. In comparison with this the puny 20,000,000 steam-power of man sinks into utter insignificance. This steam-power is, however, only the utilization by man of the merest trifle of the sun's heat, stored away in past ages and bottled up for future use in the shape of coal and wood. Such are some of the giant forces in the midst of which we live. Forces so delicately balanced, so nicely adjusted, that such estimates strike one as incredible. And all these mighty forces to-day are going to waste on every hand! The direct rays of the sun, the rise and fall of the tides, electricity, magnetism, gravitation—these and many others, all strong servants—stand willing and waiting for the master who shall bend their vast energies to the service of humanity.

* From Prof. A. Jay Dubois' recent lecture, delivered before the Engineers' Association of New Haven.

A Practical Solution of the Perfect Screw Problem.*

BY PROF. WILLIAM A. ROGERS.

At the outset of a discussion of the problem indicated by the title of this paper, it is clearly essential that the term "perfect screw" shall be defined in the most explicit way. Perfect is a relative term. For certain purposes a piece of mechanism may be perfect, while it would fail to meet the most simple requirements of another problem. In another paper the writer has used the illustration furnished by the carpenter who was called to level up his comparator, but it will bear repeating in this connection. He had been furnished with an astronomical level, but in a short time he returned in great disgust, saying that "the level was good for nothing—that it bobbed all about. But," said he, "I have a level at home which will settle at the same spot every time." He was allowed to do so, and shortly afterward he sent word and triumphantly pointed out the evidence that the bed of the comparator was perfectly level. It need not be said that the most elementary test showed that the bed was not level, notwithstanding the evidence pointed out by the good carpenter.

A piece of mechanism of the class which the French would call mechanism of precision may be termed perfect when it meets all the requirements of the purpose for which it was constructed. Let us apply this definition to any mechanism which involves the use of a good screw. The cross-head of a planer receives its vertical movement through two screws. If one screw has a pitch differing from the other, it is evident that new adjustments will be required for every elevation. But if, after the proper adjustment has been made at one elevation, it is found that the working parts of the planer remain constant at whatever hight the cross-head may be raised, the screws may in this case properly be called perfect. Yet, if these two screws were removed from their connection with other working parts, it would without question be found that measureable errors of pitch could be detected and measured. A short screw made at the works of the Waltham Watch Company will be presently described. If reliance could be placed upon the severe tests of directs measurement which have been applied to graduations produced by this screw, it could be fairly called perfect. On the bar of speculum metal exhibited are 5000 lines ruled within a space of ½ inch, producing what is called a diffraction grating. When this grating is subjected to examination under the spectroscope, there are certain optical tests of the accuracy of the spacing for short intervals which will at once detect errors which must always elude the most careful tests by direct measurement. To the naked vision there would not seem to be much difference between this grating and those produced by Rutherford, and especially the magnificent gratings from the machine of Professor Rowland; but tried by optical tests the difference is really so great that if all the errors could be charged to the screw itself the claim of perfection could not hold for a moment.

It has been intimated that the errors shown by optical tests in diffraction gratings may not, after all, be entirely chargeable to the screw. The flatness of the surface ruled, any unequal friction between the nut and the screw, the character of the groove cut by the ruling diamond—these and many other considerations determine the character of the grating. It is now well known that, severe as the optical test is in the detection of periodic errors depending on single revolutions of the screw, it fails in the detection of errors separated at wide intervals. Indeed, even in the most perfect of all machines, Professor Rowland's, he is obliged to employ a "corrector" to eliminate the errors which are beyond the limits of direct measurement. The writer is well aware that he should speak with a good degree of moderation in this connection, since he has to a certain extent failed where Professor Rowland has succeeded; but Professor Rowland has a superior knowledge of the problem both as a physicist and as a mathematician, and his success has been achieved by the power of keen analysis, aided by his little "corrector" and a precise knowledge how to use it, having as the basis of his work a most excellent, but not a perfect, screw.

Let another illustration be taken. A cathetometer is an instrument for the measurement of vertical distances by means of one or more telescopes attached to a vertical standard upon which there is a graduated scale, usually 1 meter in length with subdivisions to millimeters. There are several well-known manufacturers of physical apparatus in Europe who advertise that these graduations are without sensible error. An investigation of the errors of several of these graduated scales during the past three years has shown that in every case the errors were found to be nearly within the requirements of the optical power of the telescopes employed, but it needed only the most superficial examination under the microscopes of the comparator to place them instantly far below the lowest limit required in an exact standard of length. Illustrations almost without limit might be multiplied to show the necessity of defining the limit of accuracy with which one ought to be content in mechanical construction. It goes without saying that real progress begins when the mechanician recognizes that there is such a limit.

A short time since the writer asked Mr. Sharpe, of the firm of Darling, Brown & Sharpe, if he would undertake to grind a perfect cylinder. His reply was very sug-

* Read at the Pittsburgh meeting of the American Society of Mechanical Engineers, May, 1884.

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SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1883.

WITNESS:—
E. M. REED."
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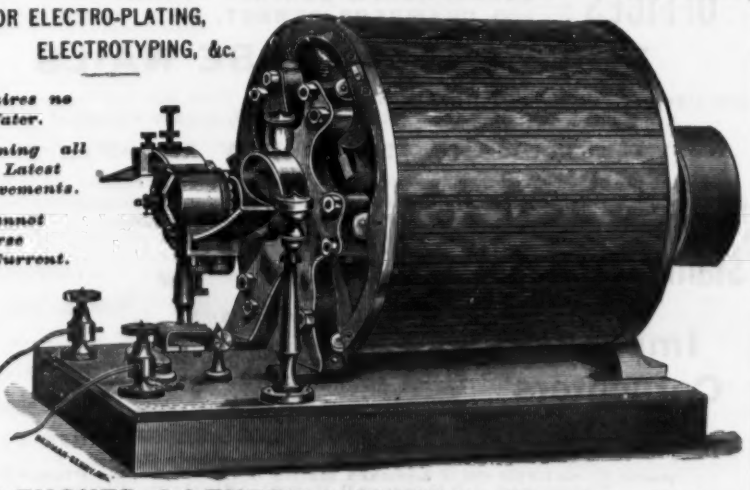

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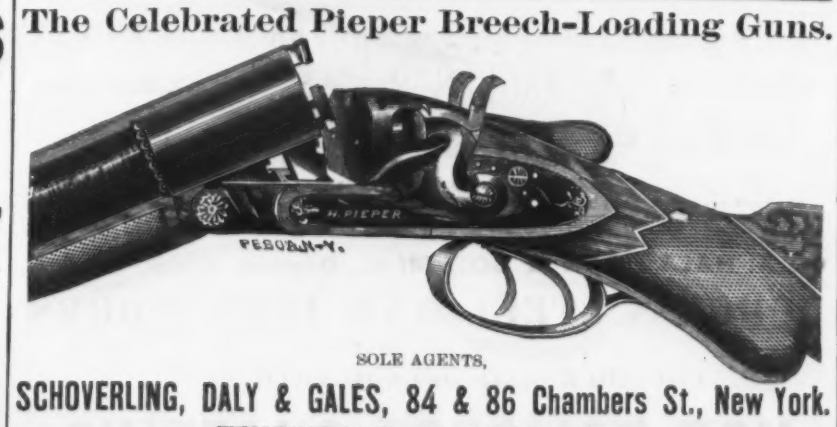

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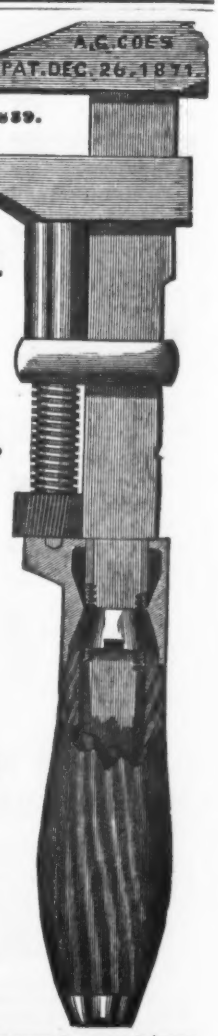

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gestive. He said: "We are not making perfect mechanism of any kind any longer in this establishment. A few years ago we felt competent to undertake perfect work of any and every kind, but we have grown wiser since then." Need it be said that the work done by this company is in many respects of a higher grade than it was 10 years ago. Five or six years ago, when ruling lines 120,000 to the inch more or less, the writer thought nothing of obtaining for the probable error of a set of measures of graduations figures low down in the millionths of an inch. It has since been learned by some not very pleasant experience that figures do not always tell the truth, especially figures which represent what are known as "probable errors"—that while straining at very small gnats, several very large camels walked by unperceived.

Let us now endeavor to answer the question, What ought we to expect of a perfect screw? Those of you who are accustomed to make screws will at once say that the answer depends to a large extent upon the length of the screw. And so it does, under the ordinary methods of construction; but in the Rogers Ballou process, which will presently be described, it is claimed that a screw 6 feet in length can be cut with nearly the same accuracy as a screw 6 inches long. At this point it is important that the errors to which screws are subject should be defined with the utmost clearness. They are of three kinds:

(*a*) An error in the total length. Supposing the pitch to be uniform at every point between the terminal threads, the whole length may either exceed or fall short of the unit of length adopted, *e. g.*, the yard at the standard temperature 62° F.

(*b*) Even if the whole length is correct, the pitch of the screw for even revolutions may not be uniform. In a perfect screw the distance from face to face of every thread in a line parallel with the axis of the screw will be the same. That is, the inclined planes formed by the threads are everywhere parallel and equidistant.

(*c*) Even if conditions (*a*) and (*b*) are fulfilled, there may yet remain a very troublesome class of errors, which are a function of single revolutions of the screw. If I rule 11 lines corresponding to even tenths of a revolution of the screw, I may find, from an examination of the spaces formed, that there is a gradual but very small increase in the length of each successive space up to a certain point, when a maximum value is reached. After this a diminution takes place which goes on until the amount of decrease is equal to the amount of the previous increase. Errors of this class are usually designated "periodic errors," since they are a function of a complete revolution of the screw. Expressed in mathematical language, every measured space gives an expression of the form.

$A = m + a \sin x + b \cos. x + a' \sin 2x + b' \cos. 2x$, &c., in which:

A = the required error.
M = a constant.
X = the angle of revolution.
a, b, a', b', &c. = unknown coefficients to be determined from a series of equations by the process of least squares.

It is important that we shall ascertain what efforts have been made to overcome these errors in the construction of screws. It is well known that the earliest systematic efforts to place the screw problem upon a substantial and scientific basis were made by Whitworth, but he profited by the labors of still earlier investigators. The following account of the early efforts in this direction, communicated to me by Mr. H. J. Chaney, Warden of the Imperial Standards of Great Britain, is such a clear and concise statement of what was accomplished by the early investigators in this field that it is quoted entire, though it was not communicated for the purpose of publication:

"In the rapid development of steam machinery there was felt a necessity for accuracy and interchangeability in parts, which in the 'screw' took practical form nearly half a century since—first, in the production of a standard guide screw, and, subsequently, in the demand for a uniform system of screw threads. In this country it is perhaps to the eminent engineering firm of Messrs. Maudslay & Co. that we are indebted for the first attempt to construct a perfect system of screws. For his dividing engine, however, Mr. Bryan Donkin had constructed in the year 1828 a standard screw fitted with a compensating bar, by means of which the errors of different parts of the screw were allowed for. Many screws were cut by this machine, of which some given to various scientific friends, and Sir J. Whitworth, among others, had one of these screws in the year 1843. Messrs. Maudslay had the advantage of the assistance of a workman whose name is now identified with all that is systematic and accurate in screw work—Whitworth—and who subsequently left them to take part, under Mr. Clements, of Lambeth, in the construction, as I understand, of Babbage's difference engine, and there produced, with Clements, the first standard guide screws.

"In a paper communicated to the Institution of Civil Engineers in 1841, Whitworth discussed the question of the want of uniformity of screw-threads, and put forward a series of sizes adapted to the use of engineers. These sizes differed from Maudslay's, and appear to have been a compromise between sizes then generally in use. For iron piping Whitworth took, as is well known, some sizes which had been adopted by Messrs. James Russell & Son, pipe manufacturers. For engineering purposes the Whitworth thread appears now to be generally adopted. For many other purposes the want of a common standard gauge for screws is much felt. A committee of the British Association, appointed in 1851 for the purpose of determining a gauge for the manufacture of small screws used in electrical apparatus and clockwork, adopted a pitch similar to the Whitworth pitch for all sizes down to ¼ inch, and also adopted the Whitworth thread above or below ¼ inch. This committee have made no definite report, and there appears to be much difference of opinion on the questions as to the inch or millimeter units, the angle of the threads, descriptive number of each size, &c."

At the outset of a discussion of the screw problem, and especially as a preliminary to any attempt to improve upon existing methods of construction, it seemed important to ascertain just what degree of accuracy had been attained thus far in the manufacture of precision screws. Accordingly, in 1879, the writer visited Baltimore, Philadelphia, Schenectady, New York and Providence, and obtained transfers from screws by Perreux, Bianchi, Clement, Brown & Sharpe, and Rutherford. As far as could be learned, these were the only screws at that time in this country possessing any claim to more than ordinary accuracy. In London a yard with subdivisions into inches was obtained from the dividing engine used by Troughton & Sims in ordinary work. In Paris a meter with subdivisions to decimeters was obtained from the dividing engine of Desmoulins-Froment. Access could not be obtained to the dividing engine of Brunner Frères, but a standard centimeter subdivided to tenths of minimeters was obtained from this firm. Application was made to Sir Joseph Whitworth & Co. for a screw 1 meter in length, but the reply was returned that the company were not prepared to do work of this class with the degree of precision required. Froment, of Paris, however, accepted the order, but it was not until two years after that the screw was delivered.

It does not seem necessary to include in this paper a full account of the investigation of the errors of these screws. The results can be stated in a few words:

(*a*) In only two cases was the total length found to be substantially correct, viz., in a yard and meter made by Brown & Sharpe and in a meter by Froment. But in both of these cases the total length was varied to correspond with the unit of length adopted by means of a "corrector." Brown & Sharpe have always exercised their undoubted right of declining to allow a personal inspection of their process, but I cannot be far from right in saying that a corrector was employed not only in the variation of the total length, but also in the correction of error due to the irregularities of the screw. In Paris, Froment accorded me the rare privilege of a personal inspection of his dividing engine. It was estimated that the corrector eliminated errors amounting to about $\frac{1}{15}$ mm., or about $\frac{1}{1500}$ inch. In the remaining cases the error in the total length was in no case less than $\frac{1}{1500}$ inch, and in one case it reached $\frac{1}{10}$ inch in one yard.

(*b*) In every case in which a corrector was not employed the error depending on single revolutions of the screw were very large, while the variations in the pitch at different points along the screw varied between $\frac{1}{100}$ inch and $\frac{1}{3000}$ inch.

(To be continued.)

The New York Mine Closed.—For the first time since mining work was actually begun at the New York iron-ore mine, 20 years ago, it has been ordered closed, instructions to that effect coming from the New York office on the 10th ult., says the *Agitator*, of Ishpeming, Mich. All mining work has lately been confined to No. 3 pit, which lies close to the Cleveland Iron Company's property, the vein at present writing being only a few feet distant from the division line, as brought down perpendicularly from the surface, which is the manner of divisions by the laws of that State. During the past three months the skip roads have been changed, and run direct to the south vein and into it. Considerable dead ground had been taken away to accomplish this, and just as a fine stopping face 25 feet wide and 20 feet in hight had been secured the mine is ordered closed, when everything was in shape to produce a neat output at a much less expense than that accompanying the mining of ore for some time back. There are about 35,000 tons of ore in stock-pile, and this has probably cost the company all they could realize in market for it at the present writing—$5.50 per ton. While changes were being made underground that were costing a great deal of money, very little ore was being raised, and the labor account was going on just the same as if the mine was producing with its old-time regularity. But 48 men have been employed for more than a year past, and these have mostly secured positions at other mines in the city. The pumps are kept moving, but the mine will probably not resume work this season. The air compressors and cylinders are being taken apart and painted, as if for a long sleep, and if higher prices is the object sought the time of awakening may be in the far future. The mine, during the 20 years of activity, has paid splendidly, and has yielded about 1,066,000 tons of ore.

Demolishing a Tall Chimney.—The demolition of the tall brick smoke-stack on the site of Halsey's mill, at Ithaca, N. Y., was accomplished on the 19th ult. An expert spent the forenoon in drilling a hole into the base of the structure, in which 5½ pounds of dynamite were placed. A small cartridge was exploded as a warning for the crowd to retire. Soon afterward the blast was fired, and a terrific explosion followed. A great mass of brick and stone, estimated to weigh 100 tons, was lifted bodily into the air, divided and fell with a crash. A piece of stone weighing 29 pounds struck and passed through J. Morrissey's frame house on the hill south of where the chimney stood. The stone crashed through the outer wall of the upper story, passed through a bedroom and struck a door casing. The plaster was knocked from the walls, and the upper part of the house has the appearance of having passed through a bombardment. The family, being in the lower part, escaped uninjured. At the residence of J. L. Baker, near Morrissey's house, a lady was struck on the arm by a piece of flying *débris*. A stone weighing 50 pounds struck and shattered a maple tree in Baker's yard.

Four large cold-storage warehouses are now in operation in New York City, and it is said that the time is not far distant when cold air will be served in pipes throughout the city, just as gas and water are now. One of the novel features of the new Washington Market, now being constructed, is a network of pipes running through the building, through which cold air will be furnished to the different meat stands.

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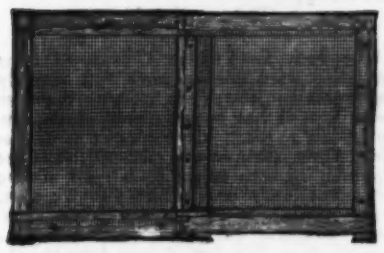

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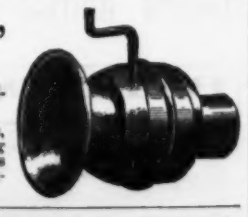

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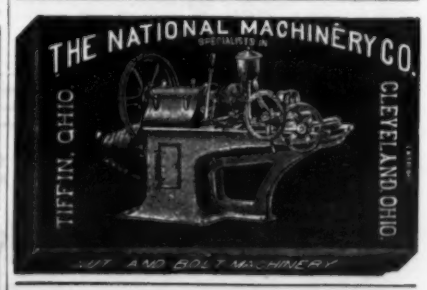

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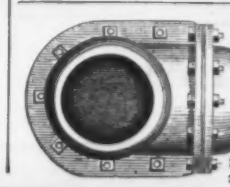

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Rules for Conducting Boiler Tests*.

BY WILLIAM KENT, M. E.

The author, after stating the necessity for standard and uniform rules for boiler tests, remarked:

As a result of the confusion of methods of making tests there is a great lack of concordance of results in tests of the same boilers when made by different engineers. Reports of tests are frequently made, and sometimes published, in which the evaporation of water per pound of fuel is greater than is theoretically possible in a perfect boiler. Communications often appear in the engineering and industrial weekly press which show that there exists a serious doubt in many minds of the accuracy of boiler tests which are made, even by eminent engineers. The advisability of the adoption of a standard method of boiler testing has been felt abroad as well as in this country. Two societies in Germany—the Union of German Engineers and the Central Union of Associations for the Care of Steam Boilers—recently appointed a joint committee, which drew up a code for the testing of steam boilers and engines, an abstract of which is published in the "American Engineer" of August 24 and 31, 1883. The German code is scarcely such a one as is likely to find favor in this country, but it is desirable that some code be adopted here which would find general acceptance. The rules appended hereto are offered as a proposition for such a code, and the intelligent criticism of our members is requested, to the end that the rules may be amended and put into such form that they will be likely to be adopted in practice. It is especially desirable that some standard method of starting and stoping the test should be adopted. I believe that the method preferred by the writer, and therefore included in the proposed set of rules, will be more generally criticised than any other of the rules, and, therefore, the reasons will here be given for the preference, mentioning some of the arguments for and against both this and the alternate methods.

METHOD OF STARTING AND STOPPING TESTS.

The conditions of the boiler and furnace should be in all respects the same at the end as at the beginning of a test. The steam pressure and the water level should be the same. The fire upon the grates should be the same in quantity and condition, and the walls, flues, &c., should be of the same temperature. It is difficult to secure uniformity in all of these conditions. Several methods to secure a near approximation to uniformity may be practiced, of which four methods will here be considered.

1. Start the test when the boiler is in full working order, with fires level on the grates and in ordinary working condition, and stop the test when fires are at the same hight and in same condition as at the beginning. The most serious objection to this method is that it introduces an element of guesswork at the beginning and at the end of the test, both as to depth of fuel on the grate and its condition. It is difficult to estimate within an inch or two the depth of fuel on the grate with a dull fire and hard coal, but still more difficult when soft or flaming coal is used, and even if possible to estimate closely the quantity of fuel, it is not possible to judge correctly of its condition as to the amount of ash it contains or as to the amount of available heating power remaining in it. For this reason I think this method of starting and stopping a test should be rejected.

2. When the fires have burned rather low, as for cleaning, remove rapidly all the fire from the grate, and clean the ash-pit, and as quickly as possible start a fresh fire with weighed wood and coal, noting the time of starting the test at the instant the fire is lighted. At the end burn the fires low, as at the beginning, and remove the whole fire, cleaning the grates, and noting the end of the test at the time when the grates are cleaned, taking note of the water level and steam pressure, which should be, as nearly as possible, the same as at the beginning. In this method an error is introduced both at the beginning and at the end. While there is no error in the estimation of the quantity of fuel used, a serious portion is wasted both at the beginning and at the end of the test by radiation and by the passing of cold currents of air through the boiler. During the operation of drawing the fire the walls of the furnace become cooled, and during the first half hour, at least, of the test, while the fire is being lighted, the fires are not burning as under ordinary working conditions, and probably not with usual economy of the fuel. At the end of the test, before opening the doors to clean, the walls of the furnace are very much hotter than they were in the beginning of the test, and a large portion of the excess of heat is lost, not being absorbed by the boiler before the ending of the test, but radiated during the cleaning, absorbed by the cold air which rushes in at the time of cleaning, or remaining in the walls after the end of the test. The heat remaining in the hot fuel withdrawn is also lost. The errors in this method are all against the boiler.

3. The fires are burned low, as in the second method, but the time of starting the test is taken to be the instant just before opening the doors to clean grates. The water level and steam pressure are noted, and all the water fed from this time to the end of the test is credited to the boiler. The fires are then rapidly cleaned and a fresh fire started with weighed wood and coal, which is charged to the boiler. At the end of the test the fires are burned low, as at the beginning, and the end of the test is taken to be the time at which the doors are opened to remove the coal from the grates, the water level and the steam pressure being noted at the same time. In this method the error is that due to the cooling of the walls of the furnace by radiation and by cold currents of air during the cleaning of the grates at the beginning of the test, and also that due to imperfect combustion during the time of lighting the fresh fire, the error being always against the boiler.

In both the second and third methods the fire removed from the grates contains a large portion of unburned coal. This is sometimes picked out and its weight deducted from that of the coal fired, but such picking can never be accurately done, and the result always shows a higher than the true percentage of ash. If the boiler test is made for the purpose of determining the quality of the coal, as well as the efficiency of the boiler with such coal, the second and third methods are thus unfavorable to the coal, since there is more unburned coal removed from the grates than there would be in ordinary working conditions. In a test in which the capacity of the boiler is an essential feature to be determined, the second and third methods also give unfavorable results, since the total time of the test, for at least half an hour, while the fresh fire is being lighted, and again when the fires are being burned down at the close, the boiler will not give its usual capacity.

4. At the regular time for slicing and cleaning fires have them burnt rather low, as is usual before cleaning, and then thoroughly cleaned; note the amount of coal left on the grate as nearly as it can be estimated; note the pressure of steam and the hight of the water level (which should be at the medium hight to be carried throughout the test) at the same time, and note this time as the time of starting the test, and fresh coal which has been weighed should now be fired. The ash-pits should be thoroughly cleaned at once after starting. Before the end of the test the fires should be burned low, just as before the start, and the fires cleaned in such a manner as to leave the same amount of fire, and in the same condition, on the grates as at the start. The water level and steam pressure should be brought to the same point as at the start, and the time of the ending of the test should be noted just before fresh coal is fired. The principal error in this method is that of estimation of the quantity and condition of the fire upon the grates. The condition of the fire is made as nearly uniform as possible by burning down and cleaning, and the error in estimation of quantity is lessened by the fact that the quantity on the grate after cleaning is less than at any other time.

On account of the various errors and inconveniences necessarily attending the first, second and third methods of making a test, the writer is inclined to favor the fourth method. Recognizing the existence of an error of uncertain quantity in the estimation of the quantity and condition of the fire upon the grate at the beginning and end of the test, it will always be less than the unavoidable error against the boiler due to the cleaning of the grates and lighting of fresh fires, as in the second and third methods, and less than the error in estimating the thickness and condition of fires, as in the first method. Where extreme accuracy is desirable, as in a competitive test between rival boiler-makers, the fourth method will be still preferred, but then a test should be made not less than 24 hours long, the working to be continuous during the whole time. The longer the test the less the percentage of error. With these preliminary observations, the proposed code of rules will now be given, which are respectfully submitted to the Society for discussion:

RULES.—PRELIMINARIES TO A TEST.

1. Establish the good condition of the boiler. Have heating surface clean inside and out, grate-bars and sides of furnace free from clinkers, dust and ashes removed from back connections, leaks in masonry stopped, and all obstructions to draft removed. See that the damper will open to full extent, and that it may be closed when desired. Test for leaks in masonry by firing a little smoky fuel and immediately closing damper. The smoke will then escape through the leaks.

2. See that the blow-off valve is perfectly tight, and that there are no leaks of water from the boiler. During the test the blow-off pipe should remain exposed, and any water which escapes from it should be measured, or preferably it should be closed by a cap.

3. See that there is no other feed-pipe connected with the boiler than the one which delivers the measured water, also that all connections with other boilers, either in water or steam spaces, are stopped with blind flanges. If an injector is used it must receive steam directly from the boiler being tested, and not from a steam-pipe or from any other boiler. All connections to or from the boiler should be broken except those in use during the test. Then if both pump and injector are attached to the boiler, the one or other should be disconnected.

4. See that the steam-pipe is so arranged that water of condensation cannot run back into the boiler. If the steam-pipe has such an inclination that the water of condensation from any portion of the steam-pipe system may run back into the boiler, it must be trapped so as to prevent this water getting into the boiler without being measured.

5. Have an understanding with the parties in whose interest the test is to be made as to the character of the coal to be used. The coal must be dry, or, if wet, a sample must be dried carefully and a determination of the amount of moisture in the coal made, and the calculation of the results of the test corrected accordingly. Wherever possible the test should be made with standard coal of a known quality. For that portion of the country east of the Allegheny Mountains, anthracite egg coal or Cumberland semi-bituminous coal should be taken as the standard for making tests. West of the Allegheny Mountains and east of the Missouri River, Pittsburgh lump coal should be used.*

6. In all important tests a sample of coal should be selected for chemical analysis.

7. Establish the correctness of all apparatus used in the test for weighing and measuring. These are: (1) Scales for weighing coal, ashes and water. (2) Tanks, or water meters for measuring water. (3) Thermometers and pyrometers for taking temperatures of air, steam, feed-water, waste-gases, &c. (4) Pressure gauges, draft gauges, &c.

8. Measure and record the dimensions, position, &c., of grate and heating surfaces, flues, chimneys, &c.

* Read at the Pittsburgh meeting of the American Society of Mechanical Engineers, May, 1884.

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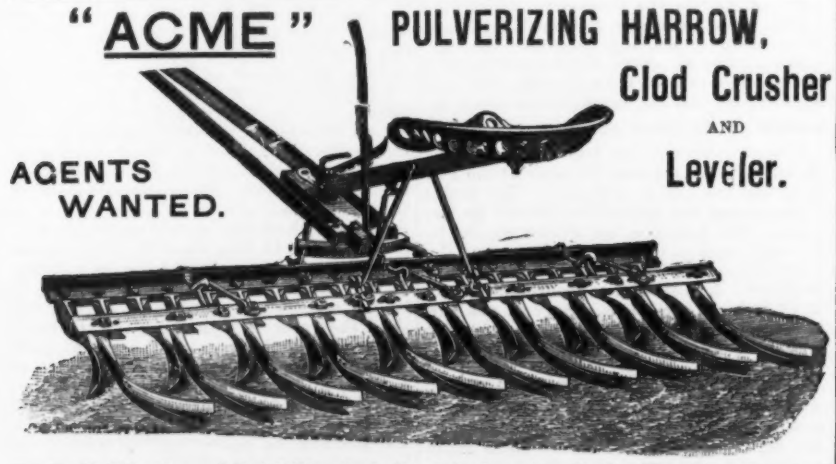

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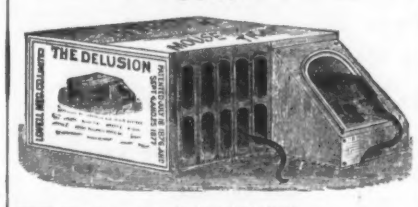
THE DELUSION MOUSE TRAP.



The Mouse goes in to get the bait,
And shuts the door by his own weight,
And then he jumps right through a hole,
thinks he's out ; but, bless his soul
He's in a cage, somehow or other,
And sets the trap to catch another.

MANUFACTURED EXCLUSIVELY BY THE

LOVELL MFG. CO., LIMITED,
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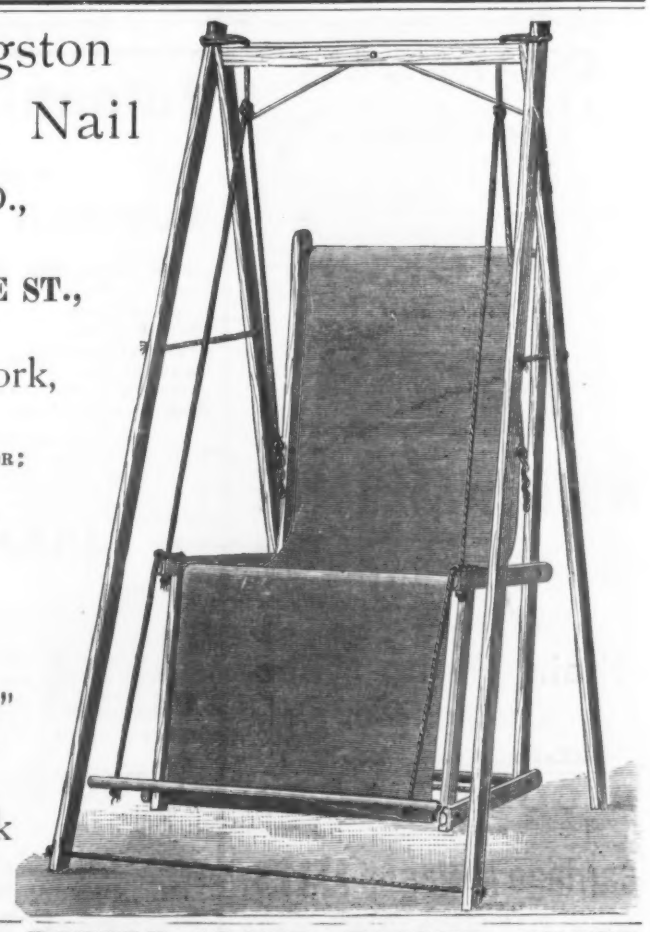
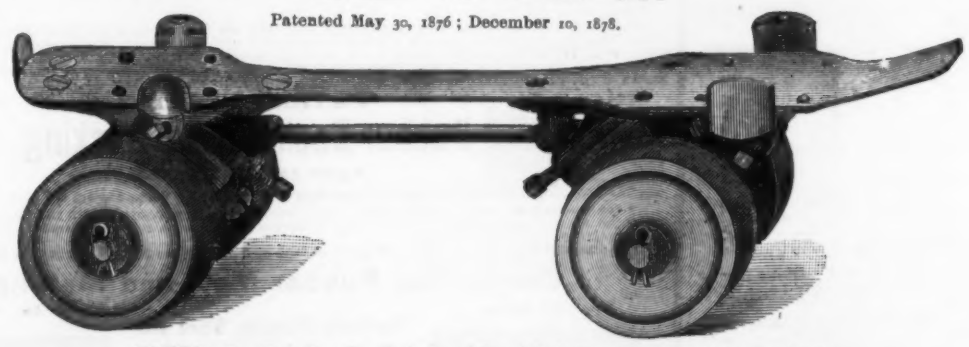


UNION HARDWARE COMPANY'S DOUBLE CLAMP ROLLER SKATE.

Nos. 76 and 77.

Patented May 30, 1876 ; December 10, 1878.



SIZES—8, 8 1-2, 9, 9 1-2, 10, 10 1-2, 11, 11 1-2 Inches.

These Skates have steel foot plates, blued or nickel-plated and highly polished ; clamp operated by a right and left screw, for holding both the toe and heel of the shoe, which are known, by long use on ice skates, to be as strong, durable and more easily adjusted to the varying sizes of shoes than any other form of clamp fastening, making this our most desirable Skate for renting to the public in rinks ; malleable iron trucks, steel axles, rubber springs, with adjustable screw for loose or tight tension ; Turkish boxwood wheels. Every part the best material and workmanship, and fully guaranteed.

77, Nickeled Foot Plate, - Per Pair, $6.50. | 76, Blued Foot Plate, - Per Pair, $5 50.

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HOLDEN'S PATENT NEST OF SAWS.

	PER DOZ.
Keyhole Blades	$1.50
Compass "	2.50
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Patent Handles	2.50
Nests Complete	$12.00
DISCOUNT	

Packed ½ Doz. Sets in Box.

Nest of Saws

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

THE NEWEST AND BEST.

Barbers' Clipper.
Nickel Plated.
Every Clipper *tested.*
A *Leather Bag* with Every Clipper.
PHIPPS & BURMAN, Manufacturers.

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Write for Circulars and Prices.

PAT. GAS GENERATOR

makes gas for heating and illuminating perfectly safe. No smoke; steady flame; one-tenth cost of coal gas. For Dwellings, Churches, Factories, &c. No extra insurance. Has been used in large tinning and canning works over two years with greatest success. Can guarantee perfect satisfaction. Prices reasonable. Send for Circulars and Price List.

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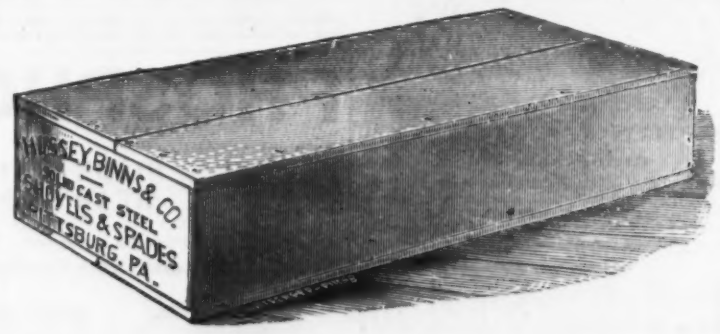

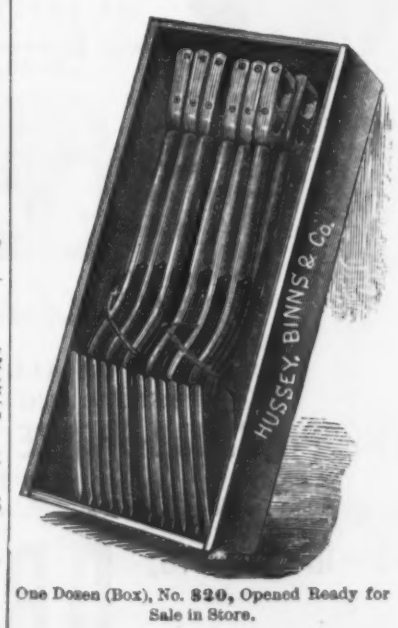

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PRICES QUOTED ON APPLICATION.

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DURRIE & McCARTY,

NEW YORK AGENTS.

9. Before beginning a test the boiler and chimney should be thoroughly heated to their usual working temperature. If the boiler is new, it should be in continuous use at least a week before testing, so as to dry the mortar thoroughly and heat the walls.

STARTING AND STOPPING A TEST.

A test should last at least 10 hours of continuous running, and 24 hours whenever practicable. The conditions of the boiler and furnace in all respects should be, as nearly as possible, the same at the end as at the beginning of the test. The steam pressure should be the same, the water level the same, the fire upon the grates should be the same in quantity and condition, and the walls, flues, &c., should be of the same temperature. To secure as near an approximation to exact uniformity as possible in conditions of the fire and in temperatures of the walls and flues, the following method of starting and stopping a test should be adopted: At the regular time for slicing and cleaning fires, have them burnt rather low, as is usual before cleaning, and then thoroughly cleaned; note the amount of coal left on the grate as nearly as it can be estimated; note the pressure of steam and the hight of the water level (which should be at the medium hight to be carried throughout the test) at the same time, and note this time as the time of starting the test; and fresh coal, which has been weighed, should now be fired. The ash-pits should be thoroughly cleaned at once after starting. Before the end of the test the fires should be burned low, just as before the start, and the fires cleaned in such a manner as to leave the same amount of fire, and in the same condition, on the grates as at the start. The water level and steam pressure should be brought to the same point as at the start, and the time of the ending of the test should be noted just before fresh coal is fired.

DURING THE TEST.

1. *Keep the Conditions Uniform.*—The boiler should be run continuously, without stopping for meal times or for rise of pressure of steam due to increase demand for steam. The draft being adjusted by means of the damper to the rate of coal combustion desired before the test is begun, it should not be changed during the test. If the boiler is not connected to the same steam-pipe with other boilers, an extra outlet for steam should be provided, in case the pressure should rise to that at which the safety-valve is set, and in case of such rise of pressure it should be reduced to the desired point by opening the extra outlet, without checking the fires. If the boiler is connected to a main steam-pipe with other boilers, the safety-valve on the boiler being tested should be set a few pounds higher than those of the other boilers, so that in case of a rise in pressure the other boilers may blow off, and the pressure be reduced by closing their dampers, allowing the damper of the boiler being tested to remain open, and firing as usual. All the conditions should be kept as nearly uniform as possible, such as force of draft, pressure of steam and hight of water. The time of cleaning the fires will depend upon the character of the fuel, the rapidity of combustion and the kind of grates. When very good coal is used and the combustion is not too rapid, a 10-hour test may be run without any cleaning of the grates other than just before the beginning and just before the end of the test. But in case the grates have to be cleaned during the test, the intervals between one cleaning and another should be uniform.

2. *Keeping the Records.*—The coal should be weighed and delivered to the firemen in equal portions, each sufficient for about one hour's run, and a fresh portion should not be delivered until the previous one has all been fired. The time required to consume each portion should be noted, the time being recorded at the instant of firing the first of each new portion. At the same time the amount of water fed into the boiler should be accurately noted and recorded, including the hight of the water in the boiler and the average temperature of feed and pressure of steam during the time. By thus recording the amount of water evaporated by successive portions of coal the record of the test may be divided into several divisions, if desired, at the end of the test, to discover the degrees of uniformity of combustion, evaporation and economy at different stages of the test. When the pressure of steam and temperature of feed are nearly constant, half-hourly observations of each will be sufficient; but when there is considerable variation, observations should be made more frequently, and the figures recorded should be the averages for each interval of time rather than the figures which are observed at the end of the interval.

3. *Priming Tests.*—In all tests in which accuracy of results is important, calorimeter tests should be made of the percentage of moisture in the steam, or of the degree of superheating. At least 10 such tests should be made during the trial of the boiler, and the final records of the boiler test corrected according to the average results of the calorimeter tests. On account of the difficulty of securing accuracy in these tests, the greatest care should be taken in the measurements of weights and temperatures. The thermometers should be accurate to within a tenth of a degree, the scales on which the condensed steam is weighed to within one-hundredth of a pound.

REPORTING THE TEST.

The final results should be recorded upon a properly prepared blank, and should conf ollotain the wing items:

1. Heating surface		sq. ft.
2. Grate surface (ft. in. long x ft. in. wide		sq. ft.
3. Ratio of heating to grate surface		
4. Kind of fuel used		
5. Duration of test		
6. Average steam pressure		lbs.
7. Average temperature of feed		deg.
8. Pounds of coal burned		lbs.
9. Pounds of refuse		lbs.
10. Pounds of combustible		lbs.
11. Per cent. of refuse		pr. ct.
12. Coal burned per sq. ft. grate per hour		lbs.
13. Total water evaporated		lbs.
14. Water evaporated per hour		lbs.
15. Water evaporated per sq. ft. heating surface per hour		lbs.
16. Water evaporated per lb. coal, actual conditions		lbs.
17. Water evaporated per lb. combustible, actual conditions		lbs.
18. Water evaporated per lb. coal, from and at 212°		lbs
19. Water evaporated per lb. combustible, from and at 212°		lbs.
20. Quality of steam (moisture or superheating)		
21. Rated horse-power (builder's rating		H. P.
*22. Horse-power developed at 30 lbs. of water evaporated per hour from and at 212°		H. P.
23. Per cent. above (or below) rated capacity		pr. ct.
54. Temperature of boiler-room		deg.
25. Temperature of flue gases		deg.
26. Force of dratt in inches of water		inches.

* The customary method of rating horse-power is 30 pounds of water per horse-power per hour from a feed-water temperature of 212° into steam at 70 pounds pressure above the atmosphere, which is equal to 30.985 pounds from feed at 212° into steam of the same temperature. The writer prefers the calculations both of economy and horse-power to be made on the basis of evaporation from and at 212°, for the sake both of uniformity and of convenience in calculation.

Steel Works at Bilboa.

It is reported from abroad that very extensive steel works are shortly to be started in Bilbao by a Spanish company, which have obtained large concessions from the Spanish Government, for the manufacture of rails and other material. The ore of Bilbao is hematite, and new blast furnaces and other works are being constructed for the smelting of it, and for the conversion of the product into rails, bars and beams of various sections. The company have ordered a very large portion of the required plant from an English firm, and it is now in course of manufacture. The converters are of 8 tons capacity, and all the hydraulic cranes and apparatus connected therewith are of the most improved kind. The engines for rolling rails, bars and beams are of very massive construction, and, it is said, are the largest that have hitherto been made. They are compound, with two high-pressure cylinders 42 inches in diameter, and two low-pressure cylinders 60 inches in diameter, with 5-foot stroke. The crank-shaft is of steel, 25 inches in diameter in the center. The total weight of the engines is 400 tons. Some of the hydraulic rams are also of enormous size, one of them being 32 inches in diameter. The center crane, which receives the molten steel from the converters, weighs about 90 tons. Portions of the machinery are now being delivered, and it is intended that the works shall be commenced at the end of this year or the beginning of next. They will be the first works of the kind which have been started in Bilbao, the ore found there having hitherto been exported to England, Germany, Belgium and France. All the coal required for them will be supplied from England.

The report on "Natural Gas for Industrial Purposes," submitted at the joint meeting of the American Society of Mechanical Engineers and the Engineers' Society of Western Pennsylvania, recently, at Pittsburgh, and referred to at some length in a former issue, touched upon a number of points which will bear profitable investigation. Thus, the question concerning the most economical method of using the gas under steam boilers seems to be in a somewhat unsettled state. It has been suggested that the simplest and best rule to follow in attempting to secure the most satisfactory results with the fuel is to burn it at the highest possible temperature, with the proper quantity of air at the front end of the boiler, and to allow the gases to escape into the chimney flue at the lowest possible temperature. On the other hand, it has been the experience of some that the best evaporative result is gained when the gas is burned equally along the whole length of the boiler, suitable burners being arranged for this purpose. Practical experience, in fact, seems to show that this is actually the better method, but, as experiments in this direction are unquestionably capable of further development, subsequent investigation may possibly yield results more favorable to the combustion-chamber arrangement with a high heat at the front end and a relatively low heat at the back end. As to the economical consumption of the gas for general purposes, the forms of burners to be used and the methods of securing the admixture of a proper proportion of air are in need of improvement, and before this is effected it will be useless to look forward to the highly satisfactory and flattering results which have been, and are, apparently, expected in many cases. The gas fuel has, however, a number of indisputable advantages, as, for example, cleanliness and ease of application, which must be appreciated, and which, though the actual cost for consumption may be somewhat discouraging, will always prove points greatly in its favor.

Whatever the future popularity and success of the electric light may be, says the *Electrician*, it appears to be generally conceded that little or no profit can be derived from its production at a price per unit of effective light below that of illuminating gas. Perhaps the most serious of the many mistakes which have been made in the establishment of electric lighting as a profitable and permanent business was the premature announcement of many of its enthusiastic promoters that it would be found to be a cheaper illuminant than gas, which, with certain exceptions due to the presence of special conditions, has not proved to be the case. Had the ground originally been taken that the light was of better quality, more healthful and more convenient—in fact, that it was a luxury, well worth its increased cost to those who could afford to use it—the public demand for it might perhaps not have been quite so rapidly developed, but there can be no doubt that the business would have been in a far more satisfactory condition to-day than it actually is.

A cheering sign of the times comes from the College of the City of New York. President Webb says that 470 applications have been made by parents who wish their sons to enter the mechanical department of the college.

GOLD MEDAL.

INTERNATIONAL COTTON EXPOSITION · ATLANTA, GEORGIA.

AWARDED TO

SIMONDS MANUFACTURING CO.

FOR

Saws.

1881.

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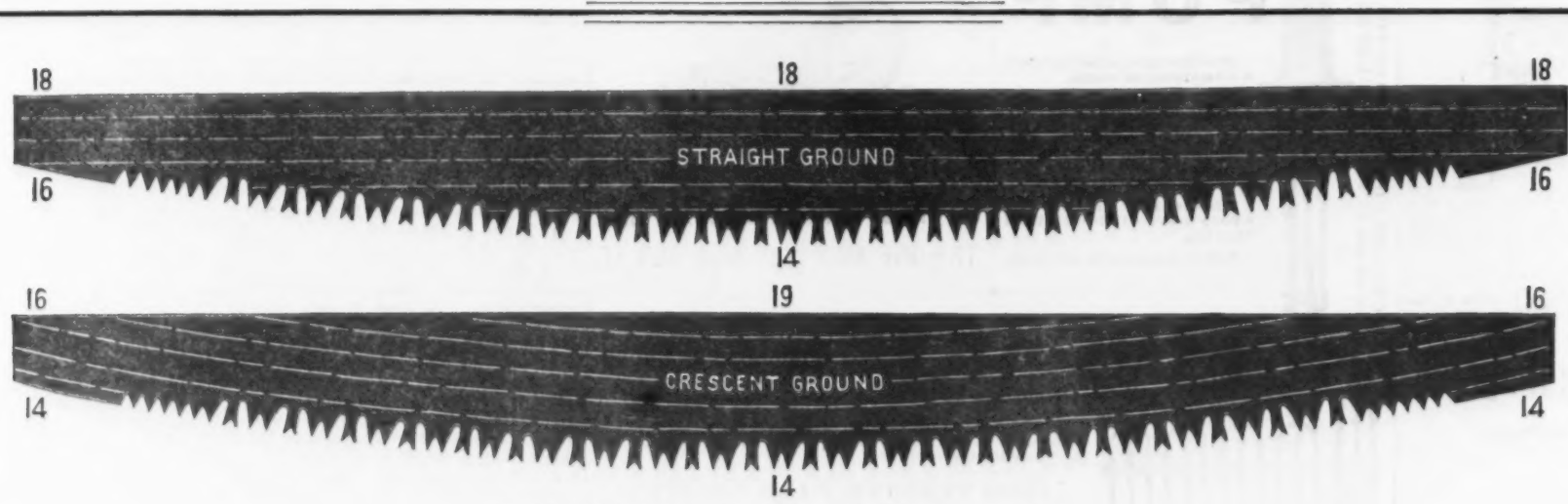
Best Display of Solid Tooth Circular Mill Saws. Recommended for Good Workmanship and Material, Superior Temper and Method of Tempering. And the Committee recommend a Special Award of a GOLD MEDAL.



(PATENTED DECEMBER 26, 1882.)

We guarantee that the Crescent-Ground Cross-Cut Saws will cut 10 per cent. more timber, same labor being used, than any other brand of Saws made; and we warrant the temper unequaled in quality and uniformity.

SIMONDS MANUF'G CO.,

FITCHBURG, MASS. CHICAGO, ILL.

THE AMERICAN INSTITUTE OF MINING ENGINEERS.

MAY MEETING, 1884.

A cold, raw, disagreeable morning, that made the possessors of overcoats objects of envy to their less fortunate fellows, greeted the members of the Institute of Mining Engineers as they stepped from the cars at Chicago on the 27th ult., prepared for the programme incident to the spring meeting of 1884. The warmth of the welcome of the local committee, however, fully compensated for the chilliness of the greeting of the weather, and the admirable programme arranged for the entertainment of the Institute has made this meeting one to be remembered by those who were so fortunate as to be present.

Among the members of the Institute at the meeting were the following:

C. A. Ashburner,	A. F. Hill,
Wm. Kent,	W. F. Durfee,
A. H. Wolf,	S. M. Buck,
F. W. Clark,	P. Frazer,
P. F. Lobanoff,	E. B. Coxe,
W. H. Morris,	A. B. Coxe,
Edgar S. Cook,	E. B. Ely,
Edward S. Davies,	H. Y. Haws, Jr.,
E. K. Landis,	G. C. Gardner,
Chas. Ridgely,	J. C. Walker,
C. V. Hickox,	J. E. Johnson,
C. Kirckhoff, Jr.,	H. S. Smith,
J. W. Farquhar,	John Gjers,
T. L. Potts,	H. C. Freeman,
J. B. Arnold,	J. F. Holloway,
J. N. Tilemann,	J. A. Mathieu,
R. W. Raymond,	C. O. Parsons,
E. F. Eurich,	H. W. Bulkley,
E. S. Moffat,	L. E. Warner,
James Neilson,	W. R. Jones,
A. Means,	S. H. Pomeroy,
T. W. Matthiesson,	J. A. Wilson,
J. W. Hoffman,	W. B. Ridgely,
Jos. D. Weeks,	B. L. Keen,
W. H. Pettee,	N. Lilienberg,
A. C. Rand,	E. L. Wiles,
G. W. Maynard,	Geo. Merryweather,
T. W. Beewning,	W. B. Cogswell,
H. Engelmann,	J. Hartshorn,
Walter Crafts,	E. L. Brown,
R. B. Reid,	J. C. Parkes,
A. B. Wood,	T. D. Jones,
H. L. Bridgman,	W. H. Jenning,
C. A. Marshall,	J. W. Meier,
G. M. Davidson, Jr.,	A. de Dekin,
W. S. Saunders,	Geo. Lauder,
R. E. Plumb,	Frank King,
R. R. Jones,	P. N. Moore,
E. M. Ferguson,	H. R. Durkee,
C. A. Schaeffer,	J. S. Lane,
B. W. Chiever,	J. L. Gill, Jr.,
J. C. Bayles,	S. T. Wellman.

Many of the members were accompanied by their wives and other ladies.

The headquarters of the Institute were at the Grand Pacific Hotel, and most of the members were quartered there during their stay. The sessions were also held in one of the large rooms of the hotel occupied by the Appelate Court.

Tuesday Evening's Session.

Mr. O. W. Potter, president of the North Chicago Rolling Mill Company, chairman of the local committee, briefly welcomed the Institute in its behalf, expressing its gratification that Chicago had been chosen as the place of its meeting, and introduced Hon. Carter H. Harrison, mayor of the city, who, as its chief magistrate, extended a formal welcome to Chicago.

ADDRESS OF WELCOME.

The mayor said that he always regarded it as a pleasure to welcome the representatives of any industry to the city. They would show them a city but recently arisen from a quagmire to the fourth city in the world. While they were being shown the city, with its beautiful parks, unequaled by any in the world, and taking in the sights, they might find somebody who could take them in. But he hoped that such a thing would not happen. The engineers were semi-scientists and semi-laborers. He went on to show what a mining engineer's qualifications should be, and that they were fully understood and appreciated by the people of Chicago. Therefore, they welcomed them. All that the Institute did or would do he flattered himself would be for the benefit of the Garden City. This was a great year for conventions in Chicago. Presidents were to be made, and some presidents were to be left. They were glad to have the Institute with them. The Institute was welcomed with a warm heart, and he hoped that they would gain by having come to Chicago, and upon behalf of its people he extended to them a cordial greeting.

Mr. J. C. Bayles, president of the Institute, responded in its behalf, gracefully acknowledging the honor and warmth of the welcome, and neatly replying to the warning of the mayor. He was gratified to know that the value of the work of the society was appreciated, and that the members were so heartily welcomed by the mayor. No one had done so much to open up the Western territory as the miner. If Chicago was glad to welcome them, they were glad to come here. There was much in the city that they wanted to see, and if rumor was right there was much that they did not want to see, notwithstanding it was "the best governed city in the world."

The formal proceedings were then opened by the following address from the chair:

THE STUDY OF IRON AND STEEL.

Gentlemen of the American Institute of Mining Engineers, Ladies and Gentlemen: The propriety of imitating in everything, so far as I am able, the worthy example of the distinguished gentlemen who have dignified the honorable office of president of the American Institute of Mining Engineers, imposes upon me the agreeable duty of delivering an address from the chair. The prominence which has been accorded in the programme of this meeting to the discussion of subjects connected with the study of metals, especially iron and steel, has naturally given direction to my thought.

It seems to be characteristic of invention and investigation that they conform to no law of regular and uniform development. From the measurably firm ground of accepted truth and verified experience the work of original investigators is projected into the void of the unknown; and so rapid and important are the accretions of fact around such slender spars of well-directed speculation that it seems for a time as if we might go on extending and building them up until the void was fully and safely bridged. But such a line of investigation is like a cantilever with a pier at one end and nothing at the other. The limitations, not only of knowledge but of speculation, become evident as we load hypotheses upon the unsupported end of our structure; and to make our work of value we must find a solid basis somewhere else, build thereon a pier and project therefrom a second cantilever. When these meet and are securely united, we have spanned one of the spaces between facts learned by observation and experience, and can safely pass over to a point from which new speculations and verifications may serve as a basis for further progress.

We are impressed with the appropriateness of this figure when we examine the steps by which we have gained what little knowledge we already possess of the composition and properties of iron and steel. That we know as much as we do concerning them is surprising when we reflect that among our membership are many whose lives almost include the period in which these materials have been intelligently and systematically studied.

The progress of chemical science applicable to iron and steel analysis naturally invites attention first. Before quantitative analysis was attempted, certain of the crude reactions of qualitative analysis were recognized. Paracelsus, the marvelous charlatan who lived from 1493 to 1541, knew of some of these, and Boyle, an earnest worker in this field, records several in his "Essay on the Usefulness of Experimental Philosophy," published in 1671. Marggraf, who lived from 1709 to 1783, is the first chemist who is credited with analyses of minerals. Thomson, in his history of chemistry (London, 1831), says of Marggraf's works: "His attempts were rude, but their importance was soon perceived by other chemists, particularly by Bergman (1735 to 1784) and Scheele (1742 to 1786), whose industry and address brought the art to considerable perfection." Bergmann, whose "De Analysi Ferri" was published in 1770, has left a very interesting record of his experimental work, which contributed in a material degree to advance the knowledge of the difference between iron and steel. He employed his pupils to collect specimens of iron from the different Swedish forges, and all of these specimens, to the number of 89, he subjected to a chemical examination by dissolving them in dilute sulphuric acid. He measured the volume of hydrogen gas which he obtained by dissolving a grain weight of each, and noted also the quantity and nature of the undissolved residue. The general result of the whole investigation was that pure malleable iron yielded most hydrogen gas, steel less and cast iron least of all. The amount of Bergmann's knowledge and the value of his methods may be judged from a table of percentages which he has left us, giving the composition of cast iron, steel and wrought iron. This table shows the following results:

	Cast iron.	Steel.	Wrought iron.
Inflammable air	40.	48.	50.
Plumbago	2.20	0.50	0.12
Manganese	15.25	15.25	15.25
Siliceous earth	2.25	0.60	0.175
Iron	80.30	83.65	84.45

In manganese determinations Bergmann evidently took care to avoid the discrepancies which are said to characterize the work of modern chemists, for we find that his manganese percentage is in each case 15.25 per cent. This celebrated chemist confirmed, to his own satisfaction, the conclusions of Réamur (1683 to 1757), who considered steel an intermediate grade of metal between crude and malleable iron. His experiments showed that malleable iron left the smallest quantity of insoluble residue, steel a greater quantity, and cast iron the greatest of all, and from this he drew his conclusions with respect to the difference between iron, steel and cast iron.

"Nothing more was necessary," says Thomson, "than to apply the anti-phlogistic theory to these experiments, as was done some time after by the French chemists, in order to draw important conclusions respecting the nature of these bodies. Iron is a simple body, steel is a compound of iron and carbon, and cast iron of iron and a still greater proportion of carbon. The defective part of the experiments of Bergmann as recorded in this important paper is his method of determining the manganese in iron. In some specimens he makes manganese to amount to considerable more than one-third part of the whole. Now we know," continues Thomson, "that a mixture of two parts of iron and one of manganese is brittle and useless. We are therefore sure that no malleable iron whatever can contain any such proportion of manganese. The fact is that Bergmann's method of separating iron ores was defective. What he considered manganese was chiefly, and might be in many cases altogether, oxide of iron. Many years elapsed before a good process for separating iron from manganese was discovered." To this I may add that many more years elapsed before steel containing 30 per cent. of manganese, of which some description will be given in one of the papers to be read at this meeting, became a commercial product.

Among other investigations by Bergmann were a series of experiments made by him with a view of ascertaining the cause of brittleness in cold-short iron. He extracted from such iron a white powder, by dissolving it in sulphuric acid. This white powder he succeeded in reducing to a white and brittle metal, by fusing it with a flux and charcoal. Klaproth (1743 to 1817) soon after described this metal as a phosphuret of iron, and Scheele, with his usual sagacity, hit on a method of analyzing it and thus demonstrating its nature. Meyer seems to have conducted a line of experiments in the same direction about the time of Bergmann's work, and he made his conclusions known to chemists in time to dispute with Bergmann a claim to priority of discovery. As may be supposed, Bergmann's processes were rude and very imperfect. It was Klaproth who first systematized chemical analysis and brought the art to such a state that the processes could be imitated by others with nearly the same results in each case. Klaproth analyzed about 200 specimens of minerals and metals, and most of his conclusions were so nearly correct that his successors have, in most cases, confirmed the results he obtained. When he began his researches chemists were not acquainted with the true composition of a single mineral substance. The service which Klaproth performed for mineralogy in Germany was performed equally well in France by Vauquelin (1763 to 1829). To this chemist we are indebted for a description of the element chromium. All of the early analyses of ores, iron and steel are credited to one or the other of these two chemists. Vauquelin announced that in steel the carbon percentage averaged $\frac{1}{110}$ part. By inclosing diamonds in cavities of soft iron and igniting them they disappeared, and the inner surface of the cavity was found to be converted into steel. I am not aware that this process is employed at the present time, but, judging from the disproportion frequently noted in experimental steel manufacture between the cost and value of the product, one might suppose it is still in use. Berzelius, in the first quarter of the present century, and Ebelman, about 10 years later, made important contributions to the knowledge of reagents and methods. Berzelius was the successor of Bergmann and Scheele. All previous analyses were revised by him, and modern chemistry begins with his era. One of his iron analyses shows iron 90.80; silicium, 0.50; magnesium, 0.20; manganese, 4.57; carbon, 3.90. The pupils of Berzelius were to a great extent instructors of the chemists of to-day.

Karsten, in 1820, recognized the influence of carbon on iron, and stated his belief that iron and steel constitute a continuous series, there being no distinct lines of separation between them. In his judgment it was simply a question of carbon percentage where, in the series, a piece of iron or steel belonged. In his "Metallurgy," published in 1830, he notes the fact that pig iron contains carbon, silicon, sulphur, phosphorus, manganese, calcium, magnesium and chromium. It is probable, however, that all these elements had been previously recognized and described. As early as 1815 there was more or less speculation whether hardness or softness in steel were due to physical or chemical causes. Faraday is credited by Percy with having been, in 1882, the first to point out that a piece of hardened steel dissolved completely in hydrochloric acid, while soft steel always yielded a certain amount of carbonaceous residue when subjected to the action of that solvent. David Mushet, in "Iron and Steel" (1840) gives a very good idea of what was known of metallurgical chemistry at that time. He mentions certain ores which contain "phosphat" of iron, which was generally believed to account for the fact that the iron made from them was cold-short. Mushet, however, was by no means certain of the cause of cold-shortness. Phosphorus, he tells us, had long been regarded as the prime cause of this quality in iron, but by the practical observer this theory could not be considered tenable, for it had always been noticed that the most perfect qualities of iron, notably some of the Swedish makes, gave out in working "a very strong phosphoric smell." Regarding the condition in which carbon exists in iron, Mushet says: "In the works of those who have treated on iron I have never yet seen carbon which exists in crude iron distinguished from that absorbed by malleable iron in the process of converting it into steel. I could," he continues, "adduce many facts which to me appear quite conclusive to prove that carbon exists in crude iron in a concrete state, separable by mechanical division, and that it is united to steel in a gaseous state by the combustion of its base, inseparable in any form by the most minute mechanical reduction." It is surprising to note the earnestness and gravity with which, in 1840, these statements were made. It shows the newness of the knowledge which nowadays serves as the starting point for discussion on such topics.

Mushet treats very fully of the effect of different substances on the quality of iron. He made a number of experiments by fusing iron with different fluxes in crucibles, and noting the quality of metal produced. One section of his book is devoted to the different proportions of carbon which constitute iron and steel, and he gives the results of 14 experiments. His method was to fuse a certain number of grains of wrought iron and charcoal in varying proportions, and note the increase of weight as showing the amount of carbon taken up. Karsten, however, promptly challenged the accuracy of his methods, and proceeded to show that Mushet's tables giving the carbon percentages in iron and steel were entirely wrong—much as chemists of the present day are prone to do upon occasion.

It is unnecessary to follow from this point the progress of metallurgical chemistry toward a scientific basis. Its general employment as a means of assisting makers to control the character of their product concerns us more, and this is almost within the memory of even the youngest of our membership. Most of us can recollect when the dependence of the ironmaster and the engineer who cared to know the chemical composition of a piece of iron or steel was upon the general analytical chemist. When the influence of our technical schools began to be felt, and young men well equipped for the work began to displace, in the management of furnaces and mills, those who had gained their knowledge in the school of experience, where the instruction is not always thorough in proportion to the cost of tuition, the laboratory began to be recognized as an essential part of an iron or steel making plant, and in nearly every establishment with any pretensions to completeness the chemist has become an important member of the staff. But it is not more than 14 years ago that this was the exception rather than the rule. Among my letters I have one bearing date of 1872, written by the general manager of an important iron works. He says: "The president of our company thinks we ought to follow the fashion and have a chemist. To my mind it is a waste of money. When I want an analysis I can have it made—and that is very seldom; for the furnace manager who needs a chemist to tell him the quality of ore or limestone or whether his pig iron is soft or hard, had better resign and go to farming. However, if the president says chemist, chemist it is. My object in writing is to know if you can recommend a young man competent to fit up a laboratory and take charge of it. We have very little society here, and it is desirable that he should be a gentleman. My wife plays the piano and I do a little on the flute, and if we can get a chemist who plays the violin, we could have some music evenings. If you can suggest a man who combines these qualifications, I could employ him. I do not know what a chemist would expect, but I should not care to pay more than $70 a week."

When the demand for analytical work in connection with the iron and steel industry began to be felt, it brought into the service of the ironmaster a great many clever and ingenious chemists at home and abroad, and a varied and valuable literature of metallurgical chemistry was soon created. The need of accurate analyses was so evident that their importance was perhaps somewhat exaggerated; and for a time it seemed as if we might safely look to the chemist to answer every question which could be raised by the ironmaster or the engineer. Our confidence in tabulated percentages of the component parts of a piece of iron or steel resulted largely from the fact that we knew so little what knowledge was needed for a clear and satisfactory explanation of observed phenomena. From this over-confidence in the power of the chemist to explain everything there has been a natural, and doubtless wholesome, reaction. Experience has shown that, great as the value of a knowledge of the chemical composition of a piece of metal may be, it is, after all, only a part of the knowledge we need before we can determine with what we are dealing.

To some extent coincident with this rapid progress of chemical investigation, and within even a shorter period, we have seen the development of the physical test, with the aid of appliances which have attained marvellous perfection in surprisingly few years.

Thomas Tredgold, in his "Strength of Cast Iron," published in 1823, says: "Lord Bacon's idea of a mechanical history, which Diderot attempted to realize, is not so well calculated to fulfill his own views (concerning the advancement of the arts) as a well-directed course of experiments on the nature, forms and properties of materials. * * In chemistry much has been done, but an experimental school of mechanical science remains to be formed." Referring to the necessity for more knowledge of physical properties than was at that time possessed, Tredgold says: "The manner in which the resistance of materials has been treated by most of our common mechanical writers has also in some sense misled the practical men who are desirous of proceeding upon sure ground, and has given occasion for the sarcastic remark that the stability of a building is inversely proportioned to the science of the builder."

Coulomb, in 1784, made some important experiments on torsion, and was probably among the first to study the effect of continued stress upon the elastic limit of iron and steel. In 1818 Wilson estimated the power required to crush cast iron at 2,240,000 pounds to the cubic inch. Reynolds, quoted by Wilson, recorded an experiment in which a cube of cast iron ¼ inch square required 448,000 pounds to crush it. Tredgold considered it necessary to correct these erroneous estimates, and made numerous experiments with cast iron, testing specimens by static loads and under a drop. The results are given in the work before mentioned. He also made some experiments upon wrought iron, correcting or verifying the results reached with crude methods by various European experiments between 1758 and 1820. The modulus of elasticity of steel was probably first calculated by Dr. Thomas Young, about 1820, from the vibrations of a tuning fork. The hight of a modulus found by this method was 8,830,000 feet, and the weight per square inch was 29,000,000 pounds. That is, a bar of steel 8,830,000 feet in length and 1 inch square in cross-section would stretch from its own weight to double its original length; and its weight, 29,000,000 pounds, is the modulus of elasticity as ordinarily expressed.

It is within a century that the work of Navier, Perronet, Poleni, Telford, Brunnel and others furnished the basis for a more or less exact knowledge of some of the more easily recognized and described physical properties of iron and steel. Naturally the results reached by these experiments were as incomplete, and in many instances as mistaken, as their methods and appliances were rude and unsatisfactory. Drop hammers, single-lever testing machines and hydraulic presses were the only power appliances employed in testing during the first half of the present century. Experiments were mostly directed to ascertaining the tensile strength of materials, chiefly iron, steel and wood, under shocks or stresses which, at a single application, would produce rupture. The breaking point thus ascertained was termed the ultimate strength of the material; and until very recently the data thus gathered were the only bases for calculating the dimensions of members which were expected to resist tension. Resistance to compression was similarly determined by the application of crushing loads to cubes of unit dimensions; and this was deemed satisfactory until the experiments of Hodgkinson demonstrated the previously unrecognized influence upon resistance to compression of the ratio of diameter to length in test specimens.

Among the earlier of the experimenters in this field, Navier is entitled to special prominence. He probably did more than any one else to bring science and practice together and to make one help the other. Navier's theory of rupture under transverse strain, though since found to be correct only within certain limits, is still quite generally accepted as a basis for calculations dealing with such strains. To Woehler, in 1858, we are indebted for a knowledge of the influence of the repetition of quiescent stresses. This led to the formulation of Woehler's law, that rupture may be caused by the frequent application of stresses in no instance approximating the original ultimate strength of the metal. The recognition of this law established the significance of the elastic limit in the calculation of dimensions, and marks what is probably the most important epoch in modern methods of dimensioning.

In 1862 Kirkaldy published his "Results of an Experimental Inquiry, &c.," which effected a considerable modification of the views previously held by engineers as to the physical characteristics of materials, especially of steel. These investigations tended in a material degree to popularize experiments with construction materials in the testing machine, and created a demand for such machines and for accessory apparatus for measuring elongation, &c. The Messrs. Fairbanks were, I believe, the first to produce, in 1863, a testing machine on the multiple-lever principle, and, though of limited capacity, this was an important improvement upon previous constructions. They were quickly followed by Riehlé Bros., whose testing machines still hold a high place in the estimation of experimenters. The next great step forward was marked by the production of Thurston's automatic recording torsional testing machine. The progress continued until it culminated in the Emery testing machine, probably the most remarkable instrument of precision ever built, and the most improved type of which dates no further back than 1880. In the line of automatic recording apparatus the latest form, devised by Abbot, illustrates the high development attained in the construction of testing machine accessories.

The period from 1850 to 1875 was, without doubt, the most fruitful in additions to our knowledge of the physical properties of iron and steel as revealed by the testing machine. It comprised the investigations of Navier, Fairbairn, Woehler, Spangenberg, Kirkaldy and Thurston. The work of these and other investigators brought the physical laboratory fully abreast with the chemical laboratory, and each has given to work done in the other a value it would not otherwise have possessed. But he who should undertake the study of iron and steel with no other light than that which analysis and test can give him, though he would learn much of value, would find himself baffled at every turn by mysteries which these methods of investigation cannot solve. This is especially true of steel. In my experience, very few of those who make or use steel are prepared to accept the statement that chemical analysis alone can be relied upon to determine its quality. It may be broadly stated that certain compositions never make good steel, but the reverse cannot be asserted with equal confidence. With a given composition, the result depends primarily upon the perfect admixture of the ingredients. Imperfect melting will give an unsatisfactory product, no matter what the stock used or the composition shown by analysis of the ingot. It will also be questioned by many whether a method of accurately determining the oxide of iron in steel would materially increase the confidence we should feel in a judgment of quality. It is true that chemical methods are becoming more rapid and accumulate every day; but with as complete a knowledge of the stock from which steel is made as chemical analysis can give us, there still remain a great many uncertain factors in the equation of quality. In fact, it seems that the value of ingot analysis may easily be very much exaggerated, and that within certain limits the physical structure of a piece of metal is quite as important to be known as its chemical composition. There are many gentlemen in this audience who could substantiate, by the results of long experience, the broad statement that, without good melting and proper subsequent treatment of the ingot, good steel is impossible with any admixture of ingredients which the chemist may prescribe. Chemistry has it limitations—not quite sharply defined perhaps, but still evident. If the chemist should ever succeed in giving us a report showing the exact proportion of each constituent of a piece of metal beyond question or doubt, we might still be in the work before us where the builder is when he stands among the bricks and lumber and the sundry materials he makes use of in construction. If he knew nothing more than the count and tally of his materials, he could build nothing.

Nor is the testing machine infallible. What it shows is to a greater or less extent dependent upon what the operator seeks to have it show. We all know how, on the one hand, by sudden shock applied to a specimen under stress, it can be made to give results far below any recognized standard; and how, on the other hand, by gentle increments of stress through lengthening intervals of time, a piece of metal may be coaxed to show test results far above its real value, and apparently inconsistent with its chemical composition. But even when it is possible to have such confidence in a physical test as can only result from a knowledge that everything connected with it has been honest and fair, and surrounded by safeguards against every known source of error, we must look elsewhere than to the chemist for an explanation of many of the phenomena which the testing machine reveals. If we seek to compare the results of physical and chemical test we shall become hopelessly confused. Generalizations warranted by one relation of composition to quality will often be contradicted by a different relation; and we should reach the almost despairing conclusion that one or the other of these methods must be accepted as the sole standard by which to judge quality. Which we should choose would depend upon whether we had formed our opinions in the laboratory or in the mill.

To harmonize what seem to be the often-conflicting results of chemical analysis and physical test, we must seek for a knowledge of causes affecting quality in yet other directions. In this we have already had assistance of the greatest value. The anomalies developed by the steels made by different formulæ, and of samples of a given composition taken at different stages in the process of manufacture, have called attention to the fact that the quality of steel does not alone depend upon what it is made of.

In 1873 the building of three large iron-clads was begun at Brest and L'Orient, and

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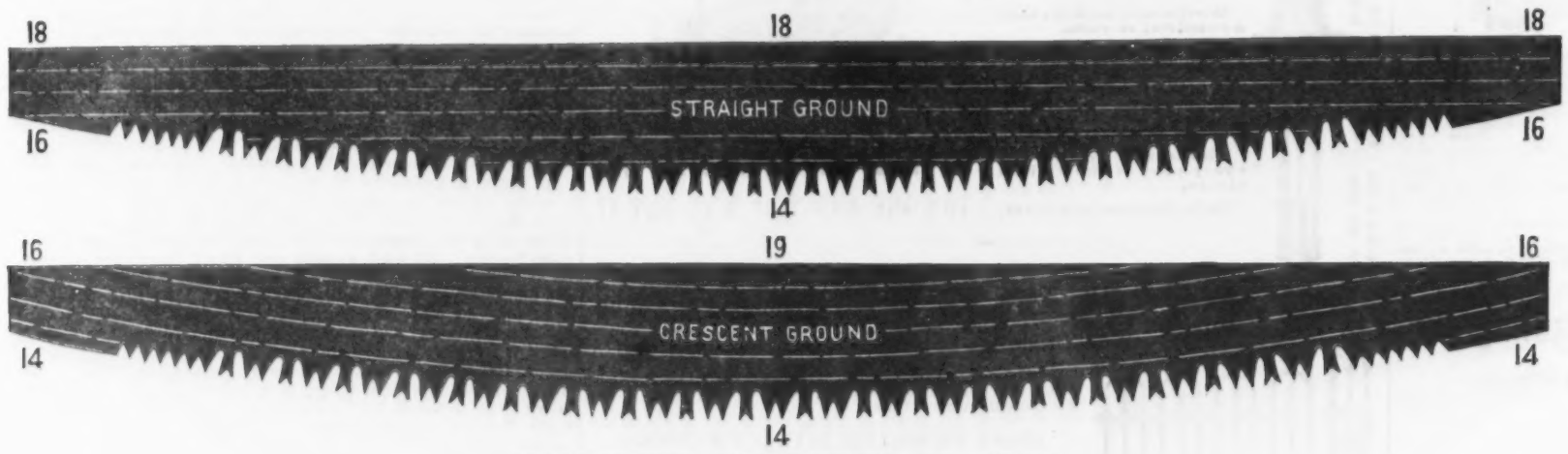

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We guarantee that the Crescent-Ground Cross-Cut Saws will cut 10 per cent. more timber, same labor being used, than any other brand of Saws made; and we warrant the temper unequaled in quality and uniformity.

SIMONDS MANUF'G CO.,

FITCHBURG, MASS. CHICAGO, ILL.

THE AMERICAN INSTITUTE OF MINING ENGINEERS.

MAY MEETING, 1884.

A cold, raw, disagreeable morning, that made the possessors of overcoats objects of envy to their less fortunate fellows, greeted the members of the Institute of Mining Engineers as they stepped from the cars at Chicago on the 27th ult., prepared for the programme incident to the spring meeting of 1884. The warmth of the welcome of the local committee, however, fully compensated for the chilliness of the greeting of the weather, and the admirable programme arranged for the entertainment of the Institute has made this meeting one to be remembered by those who were so fortunate as to be present.

Among the members of the Institute at the meeting were the following:

C. A. Ashburner,	A. F. Hill,
Wm. Kent,	W. F. Durfee,
A. H. Wolf,	S. M. Buck,
F. W. Clark,	P. Frazer,
P. F. Lobanoff,	E. B. Coxe,
W. H. Morris,	A. B. Coxe,
Edgar S. Cook,	E. B. Ely,
Edward S. Davies,	H. Y. Haws, Jr.,
E. K. Landis,	G. C. Gardner,
Chas. Ridgely,	J. C. Walker,
C. V. Hickox,	J. E. Johnson,
C. Kirckhoff, Jr.,	H. S. Smith,
J. W. Farquhar,	John Gjers,
T. L. Potts,	H. C. Freeman,
J. B. Arnold,	J. F. Holloway,
J. N. Tilemann,	J. A. Mathieu,
R. W. Raymond,	C. O. Parsons,
E. F. Eurich,	H. W. Bulkley,
E. S. Moffat,	L. E. Warner,
James Neilson,	W. R. Jones,
A. Means,	S. H. Pomeroy,
T. W. Matthiesson,	J. A. Wilson,
J. W. Hoffman,	W. B. Ridgely,
Jos. D. Weeks,	B. L. Keen,
W. H. Pettee,	N. Lilienberg,
A. C. Rand,	E. L. Wiles,
G. W. Maynard,	Geo. Merryweather,
T. W. Beewning,	W. B. Cogswell,
H. Engelmann,	J. Hartshorn,
Walter Crafts,	E. L. Brown,
R. B. Reid,	J. C. Parkes,
A. B. Wood,	T. D. Jones,
H. L. Bridgman,	W. H. Jenning,
C. A. Marshall,	J. W. Meier,
G. M. Davidson, Jr.,	A. de Dekin,
W. S. Saunders,	Geo. Lauder,
R. E. Plumb,	Frank King,
R. R. Jones,	P. N. Moore,
E. M. Ferguson,	H. R. Durkee,
C. A. Schaeffer,	J. S. Lane,
B. W. Chiever,	J. L. Gill, Jr.,
J. C. Bayles,	S. T. Wellman.

Many of the members were accompanied by their wives and other ladies.

The headquarters of the Institute were at the Grand Pacific Hotel, and most of the members were quartered there during their stay. The sessions were also held in one of the large rooms of the hotel occupied by the Appelate Court.

Tuesday Evening's Session.

Mr. O W. Potter, president of the North Chicago Rolling Mill Company, chairman of the local committee, briefly welcomed the Institute in its behalf, expressing its gratification that Chicago had been chosen as the place of its meeting, and introduced Hon. Carter H. Harrison, mayor of the city, who, as its chief magistrate, extended a formal welcome to Chicago.

ADDRESS OF WELCOME.

The mayor said that he always regarded it as a pleasure to welcome the representatives of any industry to the city. They would show them a city but recently arisen from a quagmire to the fourth city in the world. While they were being shown the city, with its beautiful parks, unequaled by any in the world, and taking in the sights, they might find somebody who could take them in. But he hoped that such a thing would not happen. The engineers were semi-scientists and semi-laborers. He went on to show what a mining engineer's qualifications should be, and that they were fully understood and appreciated by the people of Chicago. Therefore, they welcomed them All that the Institute did or would do he flattered himself would be for the benefit of the Garden City. This was a great year for conventions in Chicago. Presidents were to be made, and some presidents were to be left. They were glad to have the Institute with them. The Institute was welcomed with a warm heart, and he hoped that they would gain by having come to Chicago, and upon behalf of its people he extended to them a cordial greeting.

Mr. J C. Bayles, president of the Institute, responded in its behalf, gracefully acknowledging the honor and warmth of the welcome, and neatly replying to the warning of the mayor. He was gratified to know that the value of the work of the society was appreciated, and that the members were so heartily welcomed by the mayor. No one had done so much to open up the Western territory as the miner. If Chicago was glad to welcome them, they were glad to come here. There was much in the city that they wanted to see, and if rumor was right there was much that they did not want to see, notwithstanding it was "the best governed city in the world."

The formal proceedings were then opened by the following address from the chair:

THE STUDY OF IRON AND STEEL.

Gentlemen of the American Institute of Mining Engineers, Ladies and Gentlemen: The propriety of imitating in everything, so far as I am able, the worthy example of the distinguished gentlemen who have dignified the honorable office of president of the American Institute of Mining Engineers, imposes upon me the agreeable duty of delivering an address from the chair. The prominence which has been accorded in the programme of this meeting to the discussion of subjects connected with the study of metals, especially iron and steel, has naturally given direction to my thought.

It seems to be characteristic of invention and investigation that they conform to no law of regular and uniform development. From the measurably firm ground of accepted truth and verified experience the work of original investigators is projected into the void of the unknown; and so rapid and important are the accretions of fact around such slender spars of well-directed speculation that it seems for a time as if we might go on extending and building them up until the void was fully and safely bridged. But such a line of investigation is like a cantilever with a pier at one end and nothing at the other. The limitations, not only of knowledge but of speculation, become evident as we had hypotheses upon the unsupported end of our structure; and to make our work of value we must find a solid basis somewhere else, build thereon a pier and project therefrom a second cantilever When these meet and are securely united, we have spanned one of the spaces between facts learned by observation and experience, and can safely pass over to a point from which new speculations and verifications may serve as a basis for further progress.

We are impressed with the appropriateness of this figure when we examine the steps by which we have gained what little knowledge we already possess of the composition and properties of iron and steel. That we know as much as we do concerning them is surprising when we reflect that among our membership are many whose lives almost include the period in which these materials have been intelligently and systematically studied.

The progress of chemical science applicable to iron and steel analysis naturally invites attention first. Before quantitative analysis was attempted, certain of the crude reactions of qualitative analysis were recognized. Paracelsus, the marvelous charlatan who lived from 1493 to 1541, knew of some of these, and Boyle, an earnest worker in this field, records several in his "Essay on the Usefulness of Experimental Philosophy," published in 1671. Marggraf, who lived from 1709 to 1783, is the first chemist who is credited with analyses of minerals. Thomson, in his history of chemistry (London, 1831), says of Marggraf's works: "His attempts were rude, but their importance was soon perceived by other chemists, particularly by Bergman (1735 to 1784) and Scheele (1742 to 1786), whose industry and address brought the art to considerable perfection." Bergmann, whose "De Analysi Ferri" was published in 1770, has left a very interesting record of his experimental work, which contributed in a material degree to advance the knowledge of the difference between iron and steel. He employed his pupils to collect specimens of iron from the different Swedish forges, and all of these specimens, to the number of 89, he subjected to a chemical examination by dissolving them in dilute sulphuric acid. He measured the volume of hydrogen gas which he obtained by dissolving a grain weight of each, and noted also the quantity and nature of the undissolved residue. The general result of the whole investigation was that pure malleable iron yielded most hydrogen gas, steel less and cast iron least of all. The amount of Bergmann's knowledge and the value of his methods may be judged from a table of percentages which he has left us, giving the composition of cast iron, steel and wrought iron. This table shows the following results:

	Cast iron.	Steel.	Wrought Iron.
Inflammable air	40.	48.	50.
Plumbago	2.20	0.50	0 12
Manganese	15.25	15.25	15.25
Silicious earth	2.25	0.60	0.175
Iron	80.30	83.65	84.45

In manganese determinations Bergmann evidently took care to avoid the discrepancies which are said to characterize the work of modern chemists, for we find that his manganese percentage is in each case 15.25 per cent. This celebrated chemist confirmed, to his own satisfaction, the conclusions of Réamur (1683 to 1757), who considered steel an intermediate grade of metal between crude and malleable iron. His experiments showed that malleable iron left the smallest quantity of insoluble residue, steel a greater quantity, and cast iron the greatest of all, and from this he drew his conclusions with respect to the difference between iron, steel and cast iron.

"Nothing more was necessary," says Thomson, "than to apply the anti-phlogistic theory to these experiments, as was done some time after by the French chemists, in order to draw important conclusions respecting the nature of these bodies. Iron is a simple body, steel is a compound of iron and carbon, and cast iron of iron and a still greater proportion of carbon. The defective part of the experiments of Bergmann as recorded in this important paper is his method of determining the manganese in iron. In some specimens he makes manganese to amount to considerable more than one-third part of the whole. Now we know," continues Thomson, "that a mixture of two parts of iron and one of manganese is brittle and useless. We are therefore sure that no malleable iron what ever can contain any such proportion of manganese. The fact is that Bergmann's method of separating iron ores was defective. What he considered manganese was chiefly, and might be in many cases altogether, oxide of iron. Many years elapsed before a good process for separating iron from manganese was discovered." To this I may add that many more years elapsed before steel containing 30 per cent. of manganese, of which some description will be given in one of the papers to be read at this meeting, became a commercial product.

Among other investigations by Bergmann were a series of experiments made by him with a view of ascertaining the cause of brittleness in cold-short iron. He extracted from such iron a white powder, by dissolving it in sulphuric acid. This white powder he succeeded in reducing to a white and brittle metal, by fusing it with a flux and charcoal. Klaproth (1743 to 1817) soon after described this metal as a phosphuret of iron, and Scheele, with his usual sagacity, hit on a method of analyzing it and thus demonstrating its nature. Meyer seems to have conducted a line of experiments in the same direction about the time of Bergmann's work, and he made his conclusions known to chemists in time to dispute with Bergmann a claim to priority of discovery. As may be supposed, Bergmann's processes were rude and very imperfect. It was Klaproth who first systematized chemical analysis and brought the art to such a state that the processes could be imitated by others with nearly the same results in each case. Klaproth analyzed about 200 specimens of minerals and metals, and most of his conclusions were so nearly correct that his successors have, in most cases, confirmed the results he obtained. When he began his researches chemists were not acquainted with the true composition of a single mineral substance. The service which Klaproth performed for mineralogy in Germany was performed equally well in France by Vauquelin (1763 to 1829). To this chemist we are indebted for a description of the element chromium. All of the early analyses of ores, iron and steel are credited to one or the other of these two chemists. Vauquelin announced that in steel the carbon percentage averaged $\frac{1}{100}$ part. By inclosing diamonds in cavities of soft iron and igniting them they disappeared, and the inner surface of the cavity was found to be converted into steel. I am not aware that this process is employed at the present time, but, judging from the disproportion frequently noted in experimental steel manufacture between the cost and value of the product, one might suppose it is still in use. Berzelius, in the first quarter of the present century, and Ebelman, about 10 years later, made important contributions to the knowledge of reagents and methods. Berzelius was the successor of Bergmann and Scheele. All previous analyses were revised by him, and modern chemistry begins with his era. One of his iron analyses shows iron 90.80; silicium, 0.50; magnesium, 0.20; manganese, 4.57; carbon, 3.90. The pupils of Berzelius were to a great extent instructors of the chemists of to-day.

Karsten, in 1820, recognized the influence of carbon on iron, and stated his belief that iron and steel constitute a continuous series, there being no distinct lines of separation between them. In his judgment it was simply a question of carbon percentage where, in the series, a piece of iron or steel belonged. In his "Metallurgy," published in 1830, he notes the fact that pig iron contains carbon, silicon, sulphur, phosphorus, manganese, calcium, magnesium and chromium. It is probable, however, that all these elements had been previously recognized and described. As early as 1815 there was more or less speculation whether hardness or softness in steel were due to physical or chemical causes. Faraday is credited by Percy with having been, in 1882, the first to point out that a piece of hardened steel dissolved completely in hydrochloric acid, while soft steel always yielded a certain amount of carbonaceous residue when subjected to the action of that solvent. David Mushet, in "Iron and Steel" (1840) gives a very good idea of what was known of metallurgical chemistry at that time. He mentions certain ores which contain "phosphat" of iron, which was generally believed to account for the fact that the iron made from them was cold-short. Mushet, however, was by no means certain of the cause of cold-shortness. Phosphorus, he tells us, had long been regarded as the prime cause of this quality in iron, but by the practical observer this theory could not be considered tenable, for it had always been noticed that the most perfect qualities of iron, notably some of the Swedish makes, gave out in working "a very strong phosphoric smell." Regarding the condition in which carbon exists in iron, Mushet says: "In the works of those who have treated on iron I have never yet seen carbon which exists in crude iron distinguished from that absorbed by malleable iron in the process of converting it into steel. I could," he continues, "adduce many facts which to me appear quite conclusive to prove that carbon exists in crude iron in a concrete state, separable by mechanical division, and that it is united to steel in a gaseous state by the combustion of its base, inseparable in any form by the most minute mechanical reduction" It is surprising to note the earnestness and gravity with which, in 1840, these statements were made. It shows the newness of the knowledge which nowadays serves as the starting point for discussion on such topics.

Mushet treats very fully of the effect of different substances on the quality of iron. He made a number of experiments by fusing iron with different fluxes in crucibles, and noting the quality of metal produced. One section of his book is devoted to the different proportions of carbon which constitute iron and steel, and he gives the results of 14 experiments. His method was to fuse a certain number of grains of wrought iron and charcoal in varying proportions, and note the increase of weight as showing the amount of carbon taken up. Karsten, however, promptly challenged the accuracy of his methods, and proceeded to show that Mushet's tables giving the carbon percentages in iron and steel were entirely wrong—much as chemists of the present day are prone to do upon occasion.

It is unnecessary to follow from this point the progress of metallurgical chemistry toward a scientific basis Its general employment as a means of assisting makers to control the character of their product concerns us more, and this is almost within the memory of even the youngest of our membership. Most of us can recollect when the dependence of the ironmaster and the engineer who cared to know the chemical composition of a piece of iron or steel was upon the general analytical chemist. When the influence of our technical schools began to be felt, and young men well equipped for the work began to displace, in the management of furnaces and mills, those who had gained their knowledge in the school of experience, where the instruction is not always thorough in proportion to the cost of tuition, the laboratory began to be recognized as an essential part of an iron or steel making plant, and in nearly every establishment with any pretensions to completeness the chemist has become an important member of the staff. But it is not more than 14 years ago that this was the exception rather than the rule. Among my letters I have one bearing date of 1872, written by the general manager of an important iron works. He says: "The president of our company thinks we ought to follow the fashion and have a chemist. To my mind it is a waste of money. When I want an analysis I can have it made—and that is very seldom; for the furnace manager who needs a chemist to tell him the quality of ore or limestone or whether his pig iron is soft or hard, had better resign and go to farming. However, if the president says chemist, chemist it is. My object in writing is to know if you can recommend a young man competent to fit up a laboratory and take charge of it. We have very little society here, and it is desirable that he should be a gentleman. My wife plays the piano and I do a little on the flute, and if we can get a chemist who plays the violin, we could have some music evenings. If you can suggest a man who combines these qualifications, I could employ him. I do not know what a chemist would expect, but I should not care to pay more than $70 a week."

When the demand for analytical work in connection with the iron and steel industry began to be felt, it brought into the service of the ironmaster a great many clever and ingenious chemists at home and abroad, and a varied and valuable literature of metallurgical chemistry was soon created. The need of accurate analyses was so evident that their importance was perhaps somewhat exaggerated; and for a time it seemed as if we might safely look to the chemist to answer every question which could be raised by the ironmaster or the engineer. Our confidence in tabulated percentages of the component parts of a piece of iron or steel resulted largely from the fact that we knew so little what knowledge was needed for a clear and satisfactory explanation of observed phenomena. From this over-confidence in the power of the chemist to explain everything there has been a natural, and doubtless wholesome, reaction. Experience has shown that, great as the value of a knowledge of the chemical composition of a piece of metal may be, it is, after all, only a part of the knowledge we need before we can determine with what we are dealing.

To some extent coincident with this rapid progress of chemical investigation, and within even a shorter period, we have seen the development of the physical test, with the aid of appliances which have attained marvellous perfection in surprisingly few years.

Thomas Tredgold, in his "Strength of Cast Iron," published in 1823, says: "Lord Bacon's idea of a mechanical history, which Diderot attempted to realize, is not so well calculated to fulfill his own views (concerning the advancement of the arts) as a well-directed course of experiments on the nature, forms and properties of materials. * * In chemistry much has been done, but an experimental school of mechanical science remains to be formed." Referring to the necessity for more knowledge of physical properties than was at that time possessed, Tredgold says: "The manner in which the resistance of materials has been treated by most of our common mechanical writers has also in some sense misled the practical men who are desirous of proceeding upon sure ground, and has given occasion for the sarcastic remark that the stability of a building is inversely proportioned to the science of the builder."

Coulomb, in 1784, made some important experiments on torsion, and was probably among the first to study the effect of continued stress upon the elastic limit of iron and steel. In 1818 Wilson estimated the power required to crush cast iron at 2,240,000 pounds to the cubic inch. Reynolds, quoted by Wilson, recorded an experiment in which a cube of cast iron ¼ inch square required 448,000 pounds to crush it Tredgold considered it necessary to correct these erroneous estimates, and made numerous experiments with cast iron, testing specimens by static loads and under a drop. The results are given in the work before mentioned. He also made some experiments upon wrought iron, correcting or verifying the results reached with crude methods by various European experiments between 1758 and 1820. The modulus of elasticity of steel was probably first calculated by Dr. Thomas Young, about 1820, from the vibrations of a tuning fork. The hight of a modulus found by this method was 8,830,000 feet, and the weight per square inch was 29,000,000 pounds. That is, a bar of steel 8,830,000 feet in length and 1 inch square in cross-section would stretch from its own weight to double its original length; and its weight, 29,000,000 pounds, is the modulus of elasticity as ordinarily expressed.

It is within a century that the work of Navier, Perronet, Poleni, Telford, Brunnel and others furnished the basis for a more or less exact knowledge of some of the more easily recognized and described physical properties of iron and steel Naturally the results reached by these experiments were as incomplete, and in many instances as mistaken, as their methods and appliances were rude and unsatisfactory. Drop hammers, single-lever testing machines and hydraulic presses were the only power appliances employed in testing during the first half of the present century. Experiments were mostly directed to ascertaining the tensile strength of materials, chiefly iron, steel and wood, under shocks or stresses which, at a single application, would produce rupture. The breaking point thus ascertained was termed the ultimate strength of the material; and until very recently the data thus gathered were the only bases for calculating the dimensions of members which were expected to resist tension. Resistance to compression was similarly determined by the application of crushing loads to cubes of unit dimensions; and this was deemed satisfactory until the experiments of Hodgkinson demonstrated the previously unrecognized influence upon resistance to compression of the ratio of diameter to length in test specimens.

Among the earlier of the experimenters in this field, Navier is entitled to special prominence He probably did more than any one else to bring science and practice together and to make one help the other. Navier's theory of rupture under transverse strain, though since found to be correct only within certain limits, is still quite generally accepted as a basis for calculations dealing with such strains. To Woehler, in 1858, we are indebted for a knowledge of the influence of the repetition of quiescent stresses. This led to the formulation of Woehler's law, that rupture may be caused by the frequent application of stresses in no instance approximating the original ultimate strength of the metal. The recognition of this law established the significance of the elastic limit in the calculation of dimensions, and marks what is probably the most important epoch in modern methods of dimensioning.

In 1862 Kirkaldy published his "Results of an Experimental Inquiry, &c.," which effected a considerable modification of the views previously held by engineers as to the physical characteristics of materials, especially of steel. These investigations tended in a material degree to popularize experiments with construction materials in the testing machine, and created a demand for such machines and for accessory apparatus for measuring elongation, &c. The Messrs. Fairbanks were, I believe, the first to produce, in 1863, a testing machine on the multiple-lever principle, and, though of limited capacity, this was an important improvement upon previous constructions. They were quickly followed by Riehlé Bros., whose testing machines still hold a high place in the estimation of experimenters. The next great step forward was marked by the production of Thurston's automatic recording torsional testing machine. The progress continued until it culminated in the Emery testing machine, probably the most remarkable instrument of precision ever built, and the most improved type of which dates no further back than 1880. In the line of automatic recording apparatus the latest form, devised by Abbot, illustrates the high development attained in the construction of testing machine accessories.

The period from 1850 to 1875 was, without doubt, the most fruitful in additions to our knowledge of the physical properties of iron and steel as revealed by the testing machine. It comprised the investigations of Navier, Fairbairn, Woehler, Spangenberg, Kirkaldy and Thurston. The work of these and other investigators brought the physical laboratory fully abreast with the chemical laboratory, and each has given to work done in the other a value it would not otherwise have possessed. But he who should undertake the study of iron and steel with no other light than that which analysis and test can give him, though he would learn much of value, would find himself baffled at every turn by mysteries which these methods of investigation cannot solve. This is especially true of steel. In my experience, very few of those who make or use steel are prepared to accept the statement that chemical analysis alone can be relied upon to determine its quality. It may be broadly stated that certain compositions never make good steel, but the reverse cannot be asserted with equal confidence With a given composition, the result depends primarily upon the perfect admixture of the ingredients. Imperfect melting will give an unsatisfactory product, no matter what the stock used or the composition shown by analysis of the ingot. It will also be questioned by many whether a method of accurately determining the oxide of iron in steel would materially increase the confidence we should feel in a judgment of quality. It is true that chemical methods are becoming more rapid and accumulate every day; but with as complete a knowledge of the stock from which steel is made as chemical analysis can give us, there still remain a great many uncertain factors in the equation of quality. In fact, it seems that the value of ingot analysis may easily be very much exaggerated, and that within certain limits the physical structure of a piece of metal is quite as important to be known as its chemical composition. There are many gentlemen in this audience who could substantiate, by the results of long experience, the broad statement that, without good melting and proper subsequent treatment of the ingot, good steel is impossible with any admixture of ingredients which the chemist may prescribe. Chemistry has it limitations—not quite sharply defined perhaps, but still evident. If the chemist should ever succeed in giving us a report showing the exact proportion of each constituent of a piece of metal beyond question or doubt, we might still be in the work before us where the builder is when he stands among the bricks and lumber and the sundry materials he makes use of in construction. If he knew nothing more than the count and tally of his materials, he could build nothing.

Nor is the testing machine infallible. What it shows is to a greater or less extent dependent upon what the operator seeks to have it show. We all know how, on the one hand, by sudden shock applied to a specimen under stress, it can be made to give results far below any recognized standard; and how on the other hand, by gentle increments of stress through lengthening intervals of time, a piece of metal may be coaxed to show test results far above its real value, and apparently inconsistent with its chemical composition. But even when it is possible to have such confidence in a physical test as can only result from a knowledge that everything connected with it has been honest and fair, and surrounded by safeguards against every known source of error, we must look elsewhere than to the chemist for an explanation of many of the phenomena which the testing machine reveals. If we seek to compare the results of physical and chemical test we shall become hopelessly confused. Generalizations warranted by one relation of composition to quality will often be contradicted by a different relation; and we should reach the almost despairing conclusion that one or the other of these methods must be accepted as the sole standard by which to judge quality. Which we should choose would depend upon whether we had formed our opinions in the laboratory or in the mill.

To harmonize what seem to be the often-conflicting results of chemical analysis and physical test, we must seek for a knowledge of causes affecting quality in yet other directions. In this we have already had assistance of the greatest value The anomalies developed by the steels made by different formulæ, and of samples of a given composition taken at different stages in the process of manufacture, have called attention to the fact that the quality of steel does not alone depend upon what it is made of.

In 1873 the building of three large ironclads was begun at Brest and L'Orient, and

steel was largely used in their construction. Lieut. J. Barba, Chief Naval Constructor at L'Orient, investigated some of these anomalies, and to him we are indebted for the first exact observation of the effect of manipulations upon steel. Barba's work was ably supplemented by that of Joessell and continued by Pourcel, Holley, Metcalf, Hill and others, with the result of showing that the influence of manipulation in processes of manufacture is of prime importance in its relation to the quality of the finished product. It is important to know the chemical composition of muck bar and ingot, but experiment and experience have shown that the beam, the rail, the ship plate and the bridge member, on which the safety of the whole structure may depend, may be so far below the standard of quality which analysis would lead us to expect, or physical tests of specimens taken at intermediate stages in the processes of manufacture warrant us in assuming, that we must seek still further light on the subject in the revelations of microscopic analysis. In the microscope we have an instrument which promises to supplement the laboratory and the testing machine, to harmonize their seemingly conflicting records, and to detect the influence of shop treatment at every step in the process of manufacture. The work of the microscopists who have thus far turned their attention to iron and steel has not been complete enough as yet to give us more than a few standards by which to compare our observations; but I do not doubt that within a very few years the microscope will give the laboratory and the testing machine a value for the ironmaster, the steel-maker and the engineer incomparably greater than that they now possess. This branch of special investigation is one which offers many attractions for the conscientious student who will approach it in the earnest spirit of scientific inquiry. Within the little circle of the field of a microscope there is more to be learned of value to science and the arts than the chemist can predict or the physicist explain. It will bring us to the point beyond which no investigation can proceed. Then, as now, we shall realize that "the utmost still is hid;" but when we shall have learned all it is possible to learn from the revelations of the microscope, we shall have followed truth to the limit of human intelligence, and shall have seen it fade into infinite mystery.

Meanwhile, let us remember how new is our knowledge of iron and steel, how incomplete and how dependent is the student by one method upon the knowledge gained by other methods, some as yet almost untried. It is too soon for broad generalizations. The key to the mystery seems to lie in the structure of the metal, and until we know more of this, and can reason from effect to cause through the known phenomena of analysis and test, we may safely distrust that assurance of conviction and positiveness of utterance which Tyndall tells us are ever characteristic of "the confidence of half-knowledge."

Dr. Raymond, the secretary, in the absence of the author, read a paper by Prof. S. B. Christy, of Berkley, Cal., on "The Miners' Fund of New Almaden."

These mines, the famous quicksilver producers, are 25 miles distant from San Jose, and until the establishment of this fund were that distance from a physician. In case of sickness the fee for a visit was $25, so that from an economical standpoint it was cheaper to die than to send for a physician. There was also great delay in case of an accident. This was the condition of a community of from 400 to 700 workmen, with a total population of from 1400 to 1600. Several attempts—one as early as 1864—had been made, prior to the establishment of the present fund in 1870, to remedy this state of affairs, but with little success, and they were abandoned, Shortly after Mr. J. B. Randol assumed the direction of the mine in 1870, the miners petitioned that he assume charge of a fund, and that contributions to it be made compulsory, a voluntary fund already existing.

Under the rules as now in force, all employees of the mining company heads of families, and all other adults residing in New Almaden, pay into the fund $1 each per month. The fund so created is expended, 1, for the salaries of a resident physician-druggist and for the purchase of medical supplies; 2, for the relief of contributors and contingent expenses Contributors are entitled to the free attendance of the physician for themselves and immediate family—all others pay $5 a visit; medicines are furnished at cost; advances for relief are gifts or loans, as the trustee, Mr. Randol, elects.

Though occasional differences have arisen in the administration of this fund, they have not been of a serious character, and the rules have been changed to suit them. The physician is paid a monthly salary of $350. The receipts for 13 years have been $87,357.05, of which $80,447.30 were from collections, the balance chiefly for sales of medicines, and interest. The disbursements, $79,522.11, chiefly for physician's salary and medical stores. The cost for physician's service to members of the fund has been less than 44 cents per visit; including all expenses incurred by the fund, 72½ cents.

After an illustrated paper by W. F. Durfee, of Bridgeport, Conn., on "A Vacuum Pump and Table Blow-Pipe," Mr. Birkinbine, of Philadelphia, gave a description of the Durango Iron Mountain, of Durango, Mexico, under the title,

NOTES ON A VISIT TO THE CENO DE MERCADS IRON MOUNTAIN.

This is probably the most remarkable deposit of iron ore yet found. It is a great mass of iron about a mile long, a half mile wide, and about 600 feet high. It was practically all ore. The mountain had been purchased by American and Mexican capitalists, and a blast furnace, foundry, rolling mill, &c., were to be constructed at the foot of the mountain. At present there is no railroad connection, but one is nearing the city of Durango, which is but a mile and a half from it. The fuel to be used would be vegetable, as it was plentiful, and he believed that a moderate-sized plant would amply pay for the investment. We have already published in *The Iron Age* Mr. Birkinbine's report on this property, so that we need only refer to the paper.

Wednesday's Excursions.

Wednesday was devoted to excursions. The members of the Institute and local committee, accompanied by a large number of ladies, left the Illinois Central Depot on a special train at 9.30, as the guests of the North Chicago Rolling Mill Company for a visit to their South Chicago works. The special consisted of four Pullman parlor coaches and two day cars, so that there was more than room enough for the 200 persons who comprised the party. Mr. O. W. Potter, Secretary Hannah of the Rolling Mill Company, Mr. John Crerar, Jr., John C. Parkes and Mr. Morris Sellers took the guests in charge and conducted them through the extensive South Chicago Bessemer Works, giving the man opportunity to witness the continuous process of converting direct from the blast furnace.

At noon the party boarded the train, and, after discussing an elegant lunch provided by the North Chicago Rolling Mill Company, proceeded to Pullman, where the Allen Paper Car Wheel Works and the Corliss engine of the Pullman Car Shops were largely the center of attraction. The theater and library were also visited. Mrs. Fred. L. Fake, the librarian, took particular pains to give the visitors information as to the interest taken by the workingmen in books of travel and history, which appeared to be most in demand. At 5 o'clock in the afternoon tea was partaken of at the Hotel Florence, provided by the local committee. At 6.10 the party started for Chicago, and arrived at the Grand Pacific Hotel about 7.30 o'clock.

We shall give a further account of the incidents of the Wednesday and Thursday excursions in a future issue.

Wednesday Evening's Session.

The first paper of the session was by Mr. John Gjers, of Middlesboro', England, on

THE ROLLING OF STEEL INGOTS WITH THEIR OWN INITIAL HEAT.

This paper was a description of Mr. Gjers now well-known "soaking-pit" process' that has been so frequently referred to in our columns as not to require the reproduction of his paper in full. Mr. Gjers characterized his invention as the missing link in the chain of metallurgical operations which began with Sir Henry Bessemer in 1857. Bessemer showed how it was possible to produce steel from the fluid cast iron without further direct heat. He stopped at the ingot. The soaking-pit dispensed with "furnacing," and by the union of the two processes a rail is produced from the fluid cast iron without any application of external heat. In this country, where the general practice is to first roll the ingots into blooms 7 or 8 inches square, which are cut, heated and rolled into single length rails, the soaking-pit would only supersede the first heating, or that for rolling the ingots into blooms. If the heat in an ingot brought in a furnace to the temperature necessary to rolling be represented by 100, the heat in the fluid steel is 150; so that the steel can lose one-third of its heat in the ingot mold and sufficient remain for rolling purposes. One important distinction between furnace-heated ingots and those from the soaking-pit is that, whatever the surface heat of the latter may be, it is always hotter inside. The reverse is true of the former. The pits, with proper care, can be kept hot for ten days without difficulty when stoppages are necessary.

In addition to the saving of coal and labor in the use of the pits, there is quite a saving in the loss of steel. The loss of steel by absolute waste in the heating furnace varies in different works, but the loss in the first heating is seldom less than 2½ per cent. in the ingot after it has left the blooming rolls, and 1½ in waste heating. Numerous experiments show that the loss from the ingot to blooms in the pits is ½ per cent., or a saving of 2 per cent. This may not hold true in this country, where the ingots are quite large, but the saving will be an important one. This saving is due to the fact that the ingot, while in the pit, is entirely excluded from the action of free oxygen. Not only do the covers exclude the air, but considerable gas exudes from the steel, and, filling the pits, completely protects the ingot. This gas is composed entirely of hydrogen, nitrogen and carbonic acid, so that the ingots soaking in a perfectly non-oxidizing atmosphere. The loss in rolling rails direct for ingots from the soaking-pit is less than 1 per cent. The process has long since passed the experimental stage, and is now in continuous operation in four Bessemer works in England, two of which roll off direct without any furnacing whatever. It is also about to be started in the largest open-hearth works in Scotland. It has also been in operation for some months at two large Bessemer steel works on the Continent of Europe, and is about to be started at another, as well as at an open-hearth plant.

Mr. Gjers states that at small open-hearth plants the process cannot be used to its full extent, but in a modified method it is still applicable to these also.

The paper was discussed by Dr. Raymond, Durfee, Kent, and others, which brought out several interesting facts. In case free oxygen should be present in the pits a lump of ore the size of a walnut or a small piece of wood was thrown in. The pits had been lined with steel and iron to prevent abrasion, but these linings were apt to buckle and the pits do not get quite so hot. Mr. Gjers proposed the fire-brick pits. If these were fitted with fire clay there was not much difficulty from abrasion. Pits have been continuously at work for 12 months.

Mr. Henry C. Freeman, of Alto Pass, Ill., read a paper on "The Hydraulic Cement Works of the Utica Cement Company" at La Salle, giving a graphic and interesting account of the discovery and geological features of this deposit and the methods of the preparation of the cement.

Mr. Walter Lee Brown, of Chicago, read a paper on "A Complete Gas-Assaying Plant."

The president announced that after the explosion at the Pocahontas Mine, in Virginia, it had been suggested that an investigation of its causes be made by a committee of the Institute. He had not authority to appoint such a committee formally, but had informally requested Messrs. J. H. Bramwell, Stuart M. Buck and Prof. E. J. Williams to make such an investigation. They had done so, and the report of their investigation was to have been at the meeting, but it had been impossible to prepare it. A summary of the conclusions had been forwarded, however, which the secretary read.

THE POCAHONTAS MINE EXPLOSION.

The explosion of March 13 at Pocahontas was caused,

1. By an exceedingly dry and dusty mine, the dust coming from the coal used for ballast of the mine tracks being raised by the passing mules and drivers and floating into the chambers.

2. By the ignorance and blunder of the under bosses in distributing their door tenders at points of secondary importance, and leaving the main door untended and fastened open during the night. This had been the case during the fortnight previous to the explosion, during the night shifts, although the mine boss had visited the mine after the shifts changed. It appears, therefore, that the under bosses, one of whom perished, were not only careless, but failed to follow the rules of the company in reporting such a state of affairs to the superintendent.

3. A too careless use of powder in blasting off from the solid without making the necessary under-cuts, as was seen in one or two of the unfinished cross-cuts, and was testified to by the mine boss, though he had done nothing to suppress it or report its occurrence to the superintendent.

4. The bare possibility of a very slight amount of fire-damp. This is shown by the persistency of the flame of blown-out shots, and when the smoke from the blast was subsequently ignited. Also by a small blower found by a miner in his under-cut at one point. Against this is the fact that the committee found no trace of gas in any part of the mine before the ventilation was resumed.

Any one of the above would have been harmless by itself, but their combined effect was sufficient for the disaster. That dust was the sole agent for extending the explosion is shown in the coked dust blown against all parts exposed to the current, and by the fact that the explosion was universal; had it been gas, it would have been local.

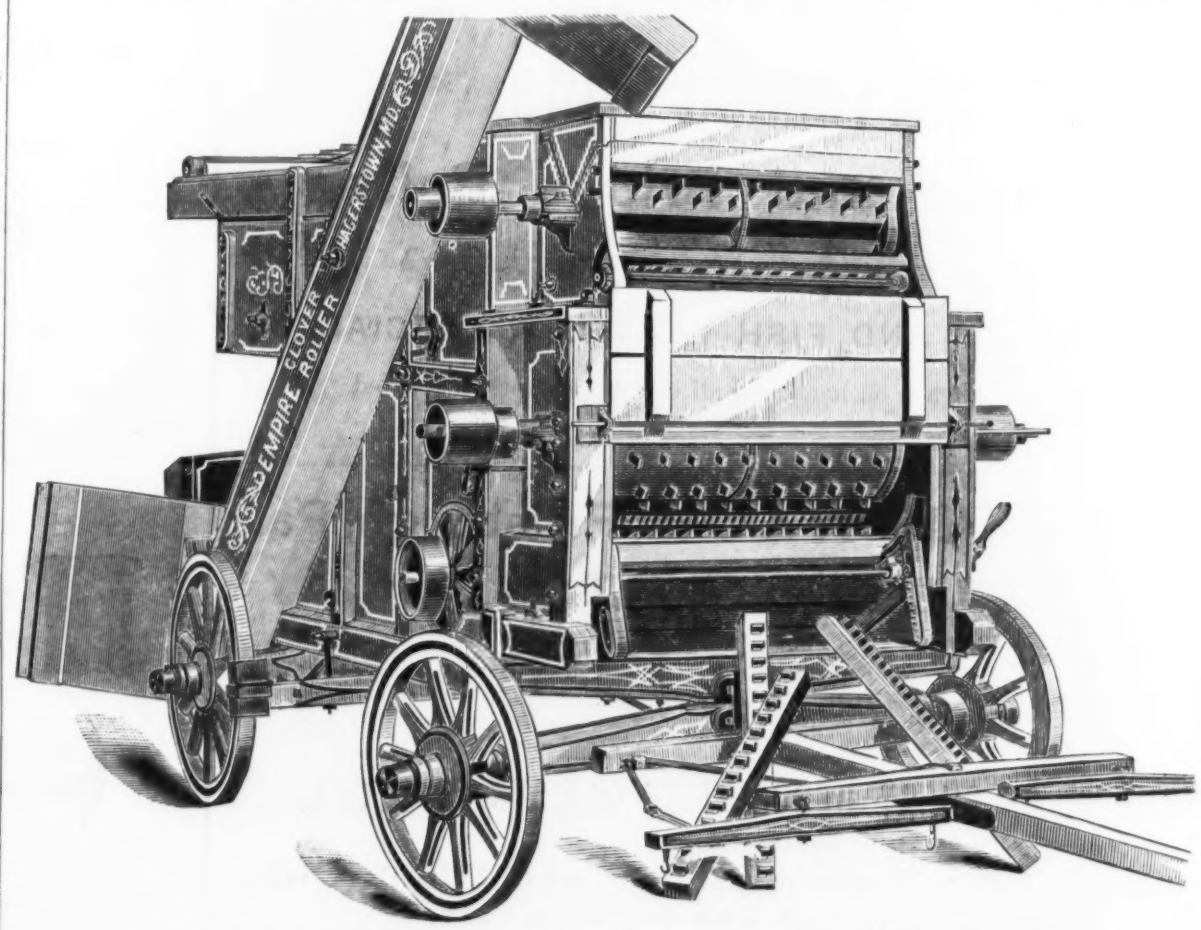
Finally, the mine was as well ventilated as the majority of non-gas producing mines in the country, and was almost the only one in the section having a fan (of 130,000 feet per minute estimated capacity, though run at half-speed); and had there been as careful work in carrying out the rules of the company by its subordinates as there was in organizing and arranging the work, there would have been no need of this committee.

Mr. Stuart M. Buck, of the committee, explained the report at length, illustrating by means of a diagram of the mine the origin and cause of the explosion and its effects. The flame passed through the whole area of the mine, and was so hot and strong that the dust which was one of the causes of the explosion was coked and forced against the walls and roof, covering them with a coating of coal, in some places quite thick. The condition of the mine was better than expected, there being but three falls. The heavy timbers used in the mine were thrown down, and the large 2-ton cars were wrecked as in a collision. The men seemed to have but little warning. One man was found with his coat over his head, as if to keep flame out, and in one part of the mine the men had started to run. At the time of the visit 112 bodies had been removed, and two men were known to be in the mine. No traces of fire-damp had been found. The paper was also discussed by Messrs. Ashburner, Lambert and others.

After a statement by Professor Frazer as to the September meeting of the Institute at Philadelphia, the session closed.

The "Empire" Clover Huller.

The "Empire" clover huller, a perspective view of which is shown in Fig. 1, is a machine introduced recently by the Hagerstown Steam Engine and Machine Company, of Hagerstown, Md. The huller cylinder is solid, having its rubbers held in place by nuts on the inside, instead of having them driven in. The fan is self-regulating, so that the blast remains constant even with a variation of 200 or 300 revolutions in the cylinders, and by their new blast-board the blast is distributed evenly through the whole width of the machine. An end-shake, perforated bottom, carries from the lower cylinder stems and rough stuff which would otherwise be handled by the riddles, returned to the elevator and put through the hullers again, causing much unnecessary trouble. The upper or thrasher cylinder has six beaters, which are made of hardwood covered with heavy sheet iron, and then faced with ⅜-inch wrought iron, through which the teeth are secured, as above mentioned, by nuts on the inside. The boxes in which the cylinder shaft runs are made of cast iron, which prevents them getting out of line. The upper concaves are four in number, the spikes of which, as well as of the cylinder, are smooth and made of steel, experience having convinced the manufacturers that the corrugated spikes in the upper cylinder grind up the stems too much. The lower huller cylinder, shown in Fig. 2, is a closed cylinder cased with hardwood, and then covered with heavy sheet iron, the trouble caused heretofore with closed cylinders by the rubbers loosening and getting into the huller being regarded as more than counterbalancing the advantages of the closed cylinder. In the cylinder of this machine the rubbers are held in with bolts, thus obviating that difficulty. The spikes or rubbers used in the lower cylinder are made of steel and are corrugated. The lower concaves extend three-fourths of the entire distance around the cylinder, thus giving an increased hulling surface. Fig. 1 shows the patented method of adjusting the lower concaves of the "Empire," by which the whole lower cylinder can be exposed in a moment and the concaves taken out to be repaired or refilled with rubbers. The manufacturers claim that this facility in effecting repairs is alone a great advantage in their machine in its saving of both time and labor. There is also a very neat device for preventing hard substances from passing into and damaging the lower cylinder, since after a stone or any like substance passes through the top cylinder it can be shut off from the lower cylinder at once by pulling out a rod convenient to the feeder's hand.



The "Empire" Clover Huller.—Fig. 1.—Perspective View, Showing Method of Adjusting Lower Concaves.

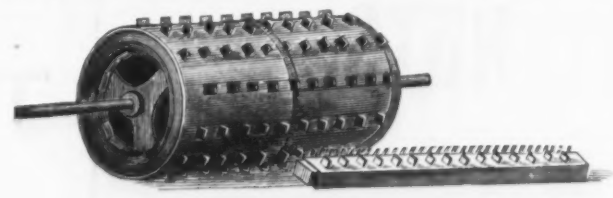


Fig. 2.—Lower Huller Cylinder and Concave.

An Old Virginia Furnace.—A communication in January last to the Charlottesville *Chronicle*, a paper published at Charlottesville, Albemarle County, Va., contains some interesting information concerning one of the blast furnaces that were built and in operation in that State before the Revolution. The furnace referred to is briefly mentioned in Jefferson's "Notes on the State of Virginia," as being located in the County of Albemarle, and its owner's name is given as one Old. The communication in the *Chronicle* says that in 1777 this furnace was then referred to as an "old furnace" that was "yet standing, tho' somewhat out of repair," but that it was proposed in the Virginia House of Burgesses to put it in blast, to aid by its product in accomplishing the independence of the colonies. This proposition took the form of a resolution appropriating a loan of £2000 to one of the proprietors, whose share in the furnace was heavily mortgaged, to enable him to co-operate with his partners in putting the furnace in blast. The furnace was then said to have been owned by Messrs. Old, Wilkinson & Trent, and Wilkinson was the partner to be benefited by the loan from the Virginia treasury. The furnace appears to have been promptly put in blast, as Jefferson, whose "Notes" were written in 1781 and 1782, says that the mines belonging to this furnace were then "worked." The name of the furnace is not given, but Jefferson says that the mines belonging to it were on the north side of James River, in Albemarle County.

The Pike's Peak Railroad.

The Pike's Peak Railroad, the completion of which within the next 18 months is practically assured, will be in many respects the most notable piece of track in the world. It will mount 2000 feet above the famous Lima and Oroya Railroad, in Peru, which is now in operation to a point 12,220 feet above the sea, the highest that the rails have as yet attained. The obstacles that are being met and overcome in its construction are among the most formidable yet presented to engineering skill. The entire 30 miles of its length will be a succession of complicated curves and grades, with no piece of straight track longer than 300 feet. The maximum grade will be 316 feet to the mile, and the average grade about 270 feet The line will abound in curves from 500 to 1000 feet long, in which the radius changes at every chain. Forty-degree curves are numerous, and there will be one of 42° that will describe three-quarters of a complete circle. The road is being built in the most substantial manner, and will be laid with 40-pound rails.

The engines will be built by H. K. Porter, of Pittsburgh, and will be of the same pattern as those now being successfully employed on the Lima and Oroya Railroad, where they are mounting grades of 448 feet and attaining practically a speed of 18 miles an hour. The coaches will be built especially strong, and will not be more than one-third the usual weight. They will be, in fact, observation cars, the upper part of the bodies being composed almost entirely of glass. The running time will be about 15 miles an hour. It is expected that the road will cost from $12,000 to $15,000 per mile. The first section of 8 miles, climbing from Manitou to the beautiful little dell called Crystal Park, 2000 feet higher in the air, is now under active construction, the company having 80 men upon their pay-roll. It is fully expected that the line will be in operation to this point by July 1, and to timber line, about 18 miles further summitward, by the close of the present year. Fully two-thirds of the grading of the first section is completed, and the line climbing the foot-hill slopes is plainly seen from Colorado Springs.

The English Wrought-Iron Tube Trade.—The wrought-iron tube-makers of England are in receipt of good orders for gas, water and steam purposes from India, Australia, New Zealand, some parts of South America, and the nearer countries upon the continent of Europe. Makers still loudly complain of the Scotch and German competition. In boiler tubes especially the Scotchmen appear to be carrying everything before them, and the Germans are selling in London at prices under those quoted by English firms.

A Gift to Cornell University.—President White, of Cornell University, Ithaca, N. Y., has received from the Hon. Hiram Sibley, of Rochester, now in Europe, a letter in which he directs that $35,000 shall be expended immediately in adding to the building and equipments of the Sibley College of Mechanical Engineering in Cornell University. Mr. Sibley also announces his intention of adding $50,000 to the endowment of the above-named department, making total gifts thus far over $150,000. This gift places Cornell in the front rank of technical institutions.

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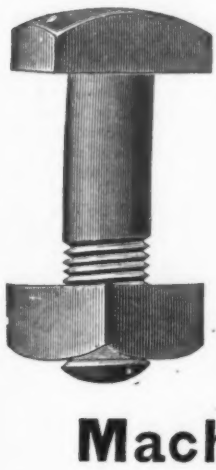

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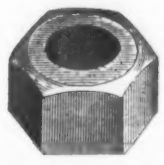

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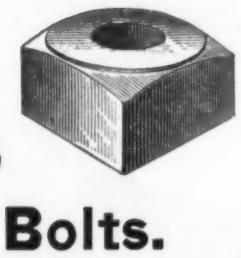

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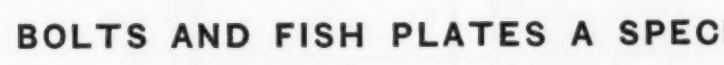

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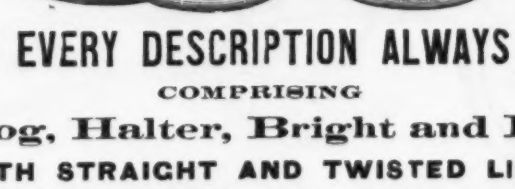

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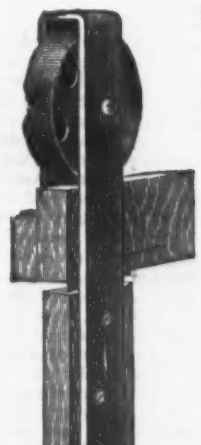

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A New Friction Brake

We illustrate in our annexed engravings a new form of friction brake brought out by Mr. Charles Beer, of Liège, Belgium, and which is claimed to overcome the difficulties ordinarily met with in the common form of Prony brake—such as, for example, excessive variations in the resistances opposed to the friction pulley. Mr. Beer, in designing the apparatus, hit upon the idea of utilizing its tendency to oscillate to increase or decrease the grip of the brake band, as the case may be, and the method in which this was accomplished will be easily understood from the engravings. A is the brake pulley, and B B are two levers connected by cross-bars, the axes

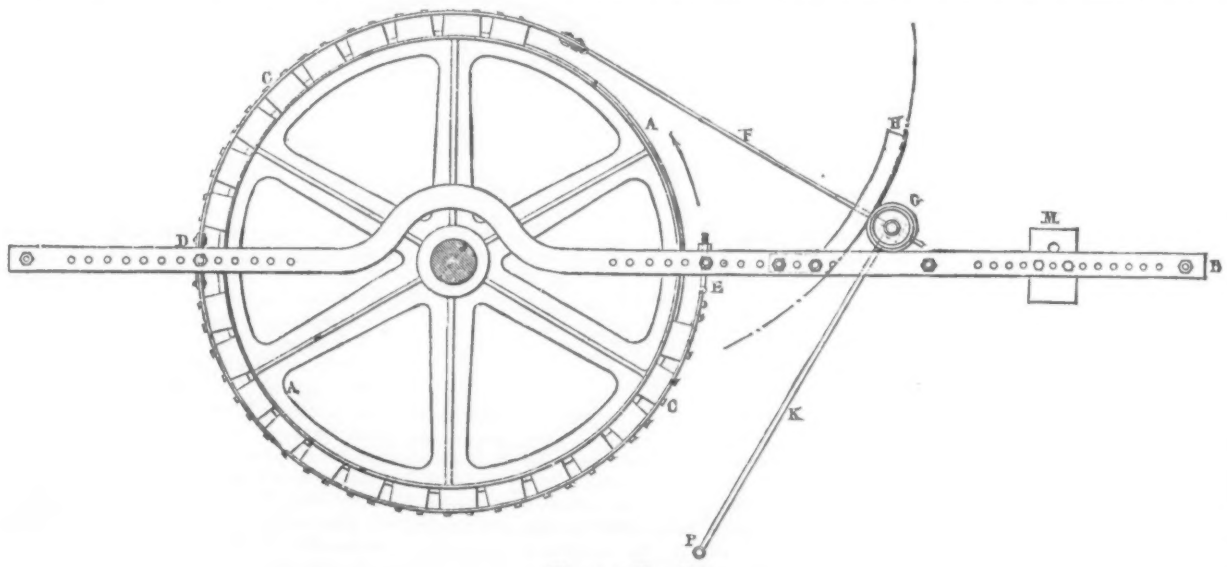

Fig. 1.—Elevation.

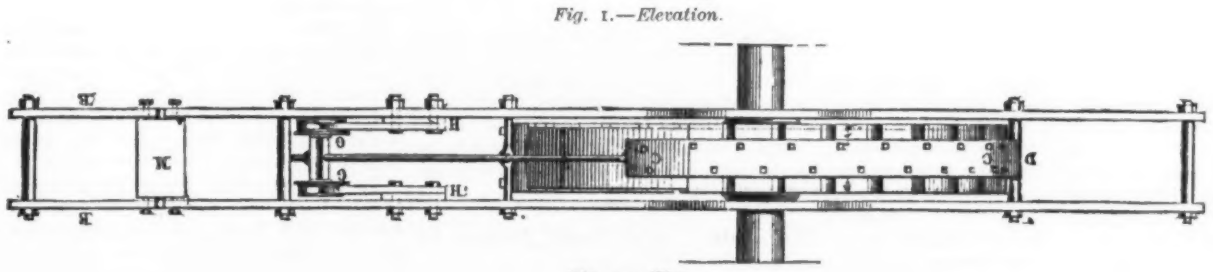

Fig. 2.—Plan.

A NEW FRICTION BRAKE.

of the levers passing through the center line of the pulley and curved so as not to interfere with the shaft. The metallic band C C is flexible, is furnished with wooden friction blocks, as shown, and is fixed at D to the two levers B B. The end E of the band is furnished with a rod, threaded, and provided with a nut, and is attached to one of the cross-bars uniting the levers B B. The other end F carries two friction rollers, G G, traveling on the curved arms H H. The latter are fixed to the levers B B, and their curvature is such that when the rollers are moved to the upper extremities the band naturally is under greater tension, and the friction between it and the pulley A is increased. A downward movement of the rollers, on the other hand, diminishes the friction. K is a light rod whose direction is parallel to a tangent to the curves H H in the position shown. One of its extremities is attached to the pin of the rollers G G, while its other end oscillates around a fixed point. When the levers B B move downward, the arms H H naturally travel in the same direction; the friction rollers, on the other hand, are supported by the rod K, and, being forced to the upper ends of the curved arms, increase the tension of the band C C, thus preventing a further descent of the two main levers. The reverse, of course, happens when these levers move upward. The latter thus oscillate within limits, depending upon the curvature of the arms H H, and even in extreme cases the movement of the counter-weight M varies only by a comparatively small quantity, owing to the fact that the horizontal levers B pass through the axis of the pulley. This is not the case with the Prony brake, and the oscillations are therefore considerably greater. In using the apparatus there is a slight error resulting from the fact that the effort exerted on the rod K being plus or minus, according as the levers B move one way or the other, will increase or decrease the action of the counter-weight M. This, however, in actual work is practically inappreciable.

NEW PUBLICATIONS.

Popular and Legal Views of Traffic Pooling. By T. M. Cooley. Size, 9 x 6 inches, 15 pages, pamphlet edition. Published by the *Railway Review*.

This pamphlet is a reprint of an article published in a recent issue of the *Railway Review*. Its author, the Hon. T. M. Cooley, Justice of the Supreme Court of Michigan, and Professor of Constitutional Law in the University of Michigan, is a well-known advocate of the railroads, having contributed a number of articles in the past in defense of their rights. The particular question of traffic pooling, to the legality of which the Hon. Mr. Cooley has devoted his arguments, is one of the most important questions demanding the attention of the public, and has here been dealt with in a very masterly and logical manner. The author introduces his subject with a brief outline of what traffic pooling is, and the object with which pools are formed, and shows that the well-known maxim, "competition is the life of trade," the shibboleth of the opponents of pools, does not hold true with the railroads under present circumstances. The condition of the railroads is next referred to, and it is shown how, in many cases, the number of roads are far more than sufficient to accommodate the regular traffic. Accepting this condition of things as a necessary one, the author contends that a system of pooling is the best means by which the railroads can be run profitably, and that, far from working disadvantageously to the public, they are, when rightfully managed, productive of increased convenience to the people, and even of mutual benefit to the railroads themselves. Concerning the legality of pooling, he shows that, though it is doubtful whether the State will ever compel the railroads to adhere to their pooling agreements, these agreements are, nevertheless, legal in the sense that they do not trespass on the rights of the people, and, therefore, do not deserve the censure which they so often receive.

Workshop Receipts. By C. G. Warnford Lock. Third series. Size, 7½ x 5 inches, 480 pages. Price $2. Published by E. & F. Spon.

The first one of this series, by Ernest Spon, was published some years ago, and fully deserved the success it met with. The second volume, by R. Haldane, was published last year, and was devoted to trades of a more or less chemical character, while the present volume is intended to deal more particularly with electrical and metallurgical matters. The subject of the practical application of electricity is treated of under the head of "Electrics," and is the most extended article in the book, covering nearly 140 pages. The theoretical treatment of this subject, the author thinks, has received abundant attention, but the details of its practical employment have only appeared in fragments and scattered articles, and he therefore justly concludes that the practical features of a science of such great importance and constantly increasing application deserves especial attention. Among a number of metallurgical articles, the one on "Iron" is the most extended, and is subdivided under several headings. This chapter on the management and working of iron also includes steel. Some 40 pages, under the heading of "Tempering," is, it is hardly necessary to state, devoted to the tempering and hardening of steel. The book being essentially a collection of receipts, the history and methods of reducing and manufacturing iron and steel are not dealt with, though some of the processes of reducing certain other of the base metals, and also silver and gold, from their ores are given quite fully. The total list of metals noted in the book numbers over 50, and, though the accounts of such rare minerals as yttrium, thorium and others are necessarily brief, the information is none the less desirable. As a book of reference for all who are interested in practical electricity and metallurgy, we can recommend it as containing an abundance of useful information on the subjects treated.

Mason's Short Tariff History of the United States. By David H. Mason. Part I. Size, 8 x 5¼ inches. 157 pages. Published by the author. Price, $1, cloth; 75 cents, paper.

It is hardly necessary to speak of this book further than to emphasize the name of its author, for Mr. Mason is so widely known, and his position in the front ranks of tariff advocates so universally acknowledged, that any product of his pen must necessarily be held in high esteem by protectionists, whose cause he upholds, and at least command earnest attention from free traders, even though his arguments may fail to convince them of error. The book constitutes part first of a tariff history of the United States, embracing the years 1783 to 1789, that unsettled period between the close of the Revolution and the final ratification of the Constitution. In reality the work is divided into two parts, the first delineating the deplorable condition of the United States at the close of the Revolutionary War and during the few years following, while trade remained unaided by protection. The second part is devoted to proving the constitutionality of the protective policy and shows that the framers of the Constitution meant that import duties should be levied for the protection of home industry, the revenue incidentally accruing being of secondary importance. The terrible industrial depression that was so widespread during the first few years of the Republic is too well known to need any rehearsal, and, in fact, Mr. Mason's account of it is nothing more than an impartial historical sketch of that unhappy period. Concerning the right of the Government to foster home industry by the levying of import duties on foreign goods, the author proves conclusively, without resorting to the implied powers or a liberal interpretation of the Constitution, that the granting to Congress the power "to regulate commerce with foreign nations," &c., was intended to mean that the Government was not only empowered to make commercial treaties with other countries, but also could impose such conditions upon trade as they should deem best fitted to promote home industry. A noticeable feature of the book is the number of quoted passages which it contains, Mr. Mason strengthening every position he takes by citing the authority of some eminent expositor of the Constitution, Hamilton, Madison, Webster, Choate and many others being called frequently to his aid. We can recommend this book to all who take an interest in the tariff questions and who would know something of their early history, the name of its author, as we remarked before, being a sufficient guarantee of its excellency.

Seraine's Vertical Gas Engine.

A writer in a recent issue of the *Annales Industrielles* directs attention to the relatively low efficiency of gas engines, taking the Otto engine as an example, owing to the imperfect utilization of the heat stored in the exploded charges of gas and air, and suggests that evidently a longer period of expansion, and consequently greater length of stroke of the engine, would yield much more satisfactory results. If we consider an engine, say, of the Otto type, but so arranged as to enable the length of stroke to be changed at will, it is apparent that during the first stroke of the piston beyond its normal limit, a greater amount of work will be developed than during the stroke preceding. A greater charge of gas and air, however, will also be taken into the cylinder during the next outward stroke, a greater amount of compression and also a corresponding increase of temperature will occur. The engine will thus naturally be prepared to develop a still greater power during the next useful stroke, the charge, compression and temperature will again be increased, and this would go on indefinitely.

In order to overcome these difficulties and at the same time to obtain all the advantages of an increased period of expansion, Mr. J. Seraine, of Paris, France, brought out the engine shown in the engravings herewith. From Fig. 3, which illustrates the principle underlying the engine, it is seen that in part A of the cylinder, reduced in section by the piston-rod, the inflammable mixture is compressed, and thence expelled into the reservoir J placed under the cylinder of the motor. The charge then passes into the space A', and is ignited by a gas-jet, as shown in Fig. 2. Figs. 1 and 2 represent elevation and section of a vertical engine of Mr. Seraine's design, whose operation will be readily understood from the following particulars:

A is the compressor and working cylinder; B, piston; C, distributing-valve, the gas and air mixture being passed through *a*, ignition taking place through *b* and exhaust

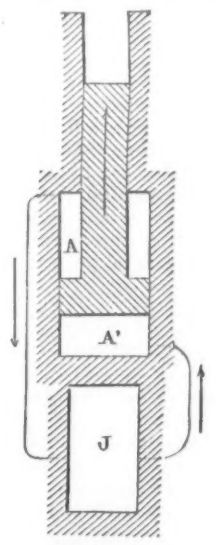

Fig. 3.—Diagram Showing Principle of the Engine.

through *c'*; D, valve-seat, furnished with the supply and exhaust channels *a* and *c*; E, valve-chest covering the small chimney *e* and gas-jet *e'*; F, admission cock; G, supply-valve of compressor cylinder, admitting air through its central part and gas through a series of holes, *g g*. H, delivery valve of compressor; I, tube conducting compressed charge to the reservoir J; J, reservoir for gas and air mixture; K, gas distributor supplying the jet *e* by means of the tube *h*, the interior burner of the valve through the tube *i*, and the valve G by means of *j* and the gas-bag *k*; L, connecting-rod; M, main shaft; N N, fly-wheels; O, cam operating the distributing-valve; P, valve-stem, carrying a friction roller, *v*, and a spring, *p*.

This arrangement permits regulating the tension of the mixture before its introduction into the working cylinder, and also the quantity to be used.

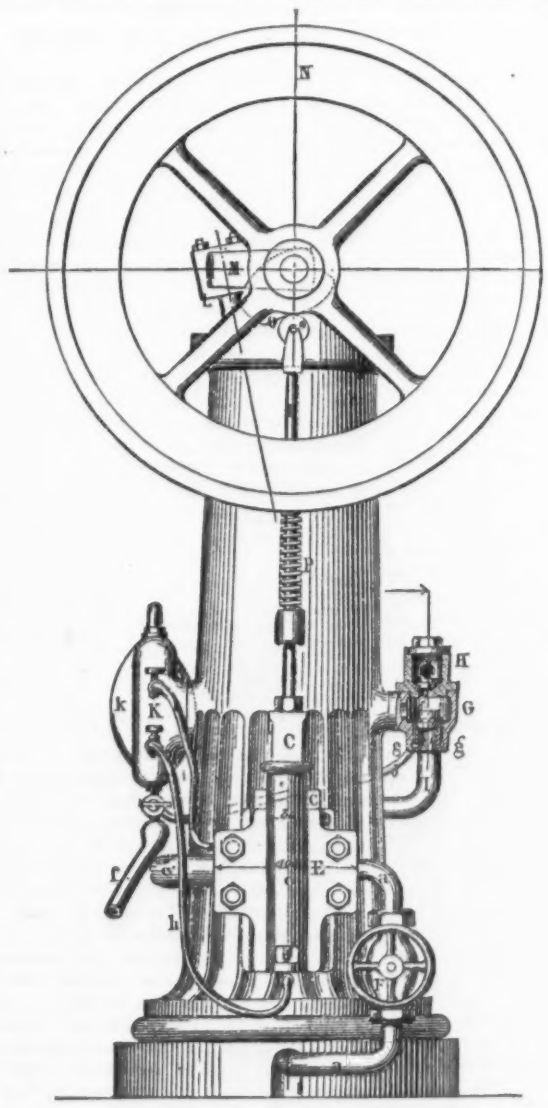

Fig. 1.—Elevation.

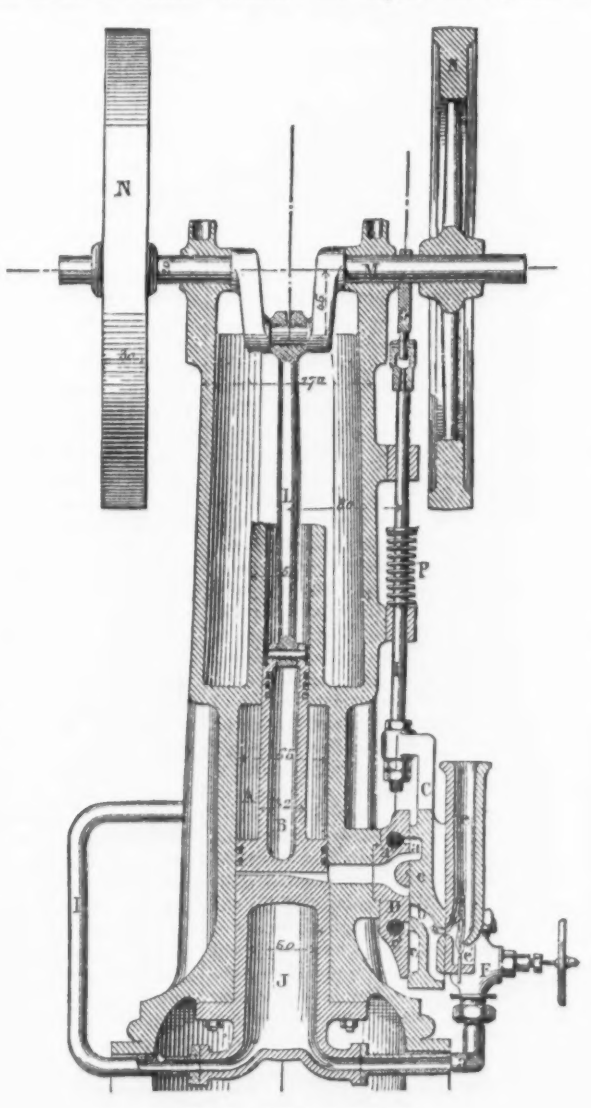

Fig. 2.—Vertical Section.

SERAINE'S VERTICAL GAS ENGINE.

It appears from recent accounts that the cost of "wiring" houses, together with that of even unpretentious fittings, lamps, switches, &c., has done considerable toward dampening the enthusiasm of the British public over the electric light for domestic use. The cost of "wiring" seems to be one of the most deterrent items. The price of current is understood to have been reduced to a figure which will compare favorably with that for gas, but, nevertheless, people are lost in wonder at what they are asked to pay to get the current to the lamps. In addition to this, the matter of throwing out gas and substituting comparatively much more costly electric light fittings is attracting its share of attention, there being apparently an urgent demand for good, appropriate, yet inexpensive, designs for pendants and brackets. Altogether the cost of properly fitting up a house is represented as absolutely prohibitive, and much yet remains to be done before the "mere matters of detail" are in such shape as to commend themselves favorably.

Saw for Cutting Stone.

An account of a new kind of saw for cutting stone, originally described in *La Semaine des Constructeurs*, which seems to have advantages over those now commonly in use, appeared in a recent issue of the *American Architect*. In place of the ordinary long steel blades, supplied with sand to enable them to grind their way into the stone, the new machine presents only a slender endless cord, composed of three steel wires twisted together, which is stretched over pulleys in such a way as to bring the lower portion horizontally over the stone to be cut. The frame carrying the pulleys is movable, so that the cord can be brought into contact with the stone or lifted away from it at pleasure, and the whole is kept in rapid motion, while water falling in drops from a reservoir above serves to moisten the stone. The three wires which form the saw differ from the ordinary kind in being square in section, and by twisting into a cord they are so turned as to present a succession of oblique cutting edges, which act, when set in motion, in nearly the same way as so many small chisels, while the rapidity with which the blows follow each other probably adds to their effect. It is not said what proportion the work accomplished by the new machine bears to that effected by the expenditure of the same amount of energy in the old form of apparatus, and the invention is probably in too rudimentary a stage to make such comparisons practicable, but the idea seems to be a good one, and with wire of suitable temper and form the cutting effect should be very considerable; while, as every one will observe, the wire saw ought to be available for use in a vertical line, like a band-saw for cutting wood, and if operated in this way could be made to saw mouldings of the most difficult sections as readily as the same forms are cut in wood.

The works commenced three years ago at the Louvre, says the *Architect*, under the direction of M. Guillaume, the architect of the museum, for the strengthening and cleansing of the basement and cellars, have occasioned the discovery of the southeast and southwest towers of the old fortress of Philip Augustus, the site of which had hitherto been placed on the river bank, just above the space now occupied by the Jardin de l'Infante. This portion of the old Louvre, as well as a hall with two naves and a central pillar, some ruined walls, buckets with sculptured heads, the remains of the curious drain which crossed the court of Francis I and emptied into the Seine after passing under what is now Room No. 4 of the Venus de Milo Gallery, a stone sculptured with the knife representing a trumpet of the time of Charles IX, and bearing date 1567, a cistern, and other curiosities, have been carefully preserved, and will be exhibited permanently in the basement, which will shortly be thrown open to the public.

In the British Parliament the Channel Tunnel bill has at last been rejected, after having been under consideration in various shapes for 10 years.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, June 5, 1884.

DAVID WILLIAMS, - *Publisher and Proprietor.*
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More Railroad Receiverships.

It has been often rumored and as often denied within the past few months that the Wabash, St. Louis and Pacific Railroad was about to pass into receivers' hands. This has at length been done within the past week, application for the appointment of receivers having been made by the company at St. Louis, in view of the default of the interest falling due June 1 on the general mortgage bonds, and the threatened seizure by foreclosure of a large amount of the equipment and terminal facilities. The company have been unable to earn their fixed charges for a long time, and their floating debt is now so large that a reorganization is apparently inevitable. This railroad is a conspicuous example of the modern policy of grouping together short roads of no special importance, and uniting them in a "system" of great pretensions without really adding to their earning power, but as an inevitable consequence making the consolidation carry a new load of stock and bonds. The statement is made from St. Louis that the divisions of the road which are earning their interest charges will be compelled by the courts to pay them. The original owners of the non-paying branches, however, will either have to fund their coupons or take back their property. A few branches may be lost in this way, but it is hardly probable that the Wabash system will be wholly disintegrated.

There are perhaps no other great railroad systems in this country so involved as the Wabash has recently been. Most of them are paying their fixed charges at least, while not a few are earning dividends and will continue to earn them under any circumstances. The Philadelphia and Reading Railroad at the beginning of the present year seemed to be on the threshold of these dividend payers, as its retiring president actually recommended a division of its profits for the year then ended among its preferred stockholders. It was deemed advisable, however, not to take a step which might prove premature and could not be continued, but the future was so promising that there was little doubt among the principal owners of a division of profits in the near future. But general trade has fallen off very considerably since the beginning of this year. The iron trade has not revived, the coal trade is at last feeling the effects of the business prostration, and the coal-carrying railroads are experiencing such a shrinkage in their receipts that their stockholders are growing uneasy, and in many cases have sacrificed their holdings rather than see still greater depreciation in the value of their property. The Philadelphia and Reading Railroad had heavy interest obligations falling due on the 1st of this month, and made some preparation for their payment, even going so far as to pay their employees in Pennsylvania in "scrip" for their April work, giving four months' notes for supplies, and cutting down their force of workmen wherever men could be spared; but it was in vain, as the necessary funds could neither be accumulated from earnings nor borrowed. The road, therefore, through its friends, made application early this week for the appointment of receivers. As this corporation now operates a number of leased lines, some of which are a heavy burden, there is much conjecture as to whether the unprofitable branches will not be lopped off. But this will hardly follow until the fact is shown that they are likely to remain unprofitable, as the new connections of the Reading now under construction will, when completed, very probably enable those branches to earn a profit which are now compelling an outlay.

The "year of receivers" is keeping up its reputation very well, but we hope the time is not far distant when business of all kinds will revive and railroad earnings will show an increase instead of a disheartening decrease. The railroads of this country are such an important consuming interest that manufacturers cannot look with indifference and without apprehension on such collapses as those of the Wabash and the Reading.

Foreign Tariffs and American Trade.

The Senate Committee on Foreign Relations, acting under authority of a resolution adopted January 22, have just issued a report on the tariff laws of the various countries of the world. Accompanying this information are comments by the committee upon the entry of American products and manufactures into the several countries. In answer to the specific question as to "what "discriminations are made against exports "from the United States by the tariff laws of "the principal countries of Europe," the committee state that, generally, none of the tariffs of the countries of Europe or America contain specific discriminations against merchandise imported from the United States, but the discriminations found in the tariff systems of some countries, particularly France and Austria-Hungary, against merchandise imported from non-treaty countries, necessarily result in placing importations from the United States at serious disadvantage. For example, on account of the great difference between the rates of duty imposed upon American goods by the general tariff and the rates imposed upon like goods imported from treaty countries under the conventional tariff, much of our merchandise cannot reach the French markets except through those countries having commercial treaties with France, such as Great Britain, Italy, &c. In illustration, it may be stated that alcohol, if imported directly from the United States into France, pays a duty of 30 francs per hectoliter, while the same article if imported from England is subjected to 15 francs per hectoliter. Cotton tissues imported from the United States into France pay nearly three times the duty which the same article pays if imported from Great Britain, and so of other articles.

The Austro-Hungarian tariff contains a provision that goods coming from countries which treat Austro-Hungarian goods with less favor than those of other nations are subject to 30 per cent. duty additional. By this provision Austria-Hungary makes declaration of the right to inquire, not only whether there is a treaty with the country of origin of the goods, but also whether, even if there is a treaty, any other country enjoys any favor which is not granted by an existing treaty to Austria-Hungary. The committee criticise this section of the Austro-Hungarian tariff, and say that if this principle be admitted, a nation without commercial treaties, or which has unsatisfactory commercial relations with other countries, may, by the simple expedient which Austria-Hungary has adopted, impose discriminations against the commerce of those nations who have not or do not place her upon an equal footing of the most favored nations. The conclusion to which the committee here arrive would seem to justify such a measure of discrimination against the countries which now exclude some of our food products, if Congress were to take such action.

Upon the subject of export duties the committee say that an export duty upon a product sent to a particular country, and levied only upon exportations to that country, would be an unfriendly discrimination, for which it would be reasonable to retaliate, but a general export duty without regard to destination cannot be regarded strictly as a discrimination, although the practical effect may be to seriously discriminate to the injury of those countries which furnish the principal markets for the product so taxed. Whether in such case it is better for the country injuriously affected to resort to discriminations as against the imports of the offending country, or to strive by negotiation to obtain reciprocity, is a question which must depend for answer upon the commercial and other conditions which surround or exist in the two nations.

Coming to the question of making articles free of duty, in the opinion of the committee it is clearly a mistake for the United States, under ordinary conditions, to place any given imports of considerable consequence upon the free list without a careful consideration of the conditions under which such products leave the country of production, and the commercial relations which exist between such country and the United States, or without at least suggesting that a reciprocal advantage be given to products of the United States which may find a market in that country. It is very plain that a country which supplies all, or even the largest part, of a kind of goods now largely imported by us, and upon which we impose a duty, would have an excellent opportunity to add to its revenues as much money as our Government would relinquish if we were to put such goods on the free list and at the same time the country of supply were to impose an export duty. Consumers here would experience no benefit in lower prices, our Government would be deprived of part of its income without any advantage accruing from such action, and the foreign power would be an immense gainer. Such an act of international philanthropy would be very highly appreciated by some of the poorer nations which trade with us.

In making any changes in tariff laws external conditions should be well examined, and domestic considerations should not entirely control the arrangement of the schedules. In cases where additions may be safely made to the free list, or duties can be reduced without disturbing any industries, it may be possible to secure reciprocal commercial favors from the countries whose products would then be admitted to our markets on more favorable terms. On this point the committee express themselves very plainly. The extension of our commerce into new fields, they say—the creation of foreign markets for American manufactures—may be effected largely by a sagacious adaptation of our tariff legislation in specific cases to the state of our commerce with the particular countries which supply us with necessary articles not produced by ourselves. Diplomacy may be in many cases most efficient in creating new conditions under which reciprocal advantages to American commerce may result in the countries from which we buy largely and sell but little, and it is submitted that it may be wise generally, before extending our free list to importations of consequence, to try, at least, the efficacy of negotiation for equitable and reciprocal benefits to ourselves.

Our Iron and Steel Imports.

The detailed statement of the imports and exports of the United States for the nine months ending March 31, 1884, together with the statistics for the corresponding period a year previous, has just been published by the Bureau of Statistics. The tables given below contain the figures for the import trade in iron and steel. On account of changes made in the schedules, which went into effect on July 1, 1883, it is impossible to make as full a comparison of the amounts and values of the imports as we would wish; but, for the purpose of simplifying the matter as much as possible, we have divided the statistics in such a manner as to allow of the most ready comparisons. The following table presents the quantities of iron and steel imports, so far as they can be ascertained from the official statement, for the two periods above mentioned:

Articles.	Nine months ended March 31. 1884. Tons.	1883. Tons.
Iron ore	409,879	529,114
Pig iron	225,527	365,354
Scrap iron, wrought and cast	39,755	62,776
Scrap steel	5,549	Not stated.
Bar iron	31,415	42,679
Iron railway bars	587	5,215
Steel railway bars	7,010	105,128
Hoop and scroll iron	125	5,080
Sheet and plate iron	7,065	9,284
Tin plates	163,942	159,466

In reviewing the above table it is gratifying to note that, notwithstanding the fact that the articles enumerated were imported at much lower prices during the nine months ending March 31, 1884, than during the similar period in 1883, the amounts of imports, with the single exception of tin plates, show a general reduction of over 30 per cent., the greatest relative reduction being in hoop and scroll iron. The pig-iron importation in this period of less than a year has suffered a reduction of not less than 150,000 tons from a total of 365,000 tons. The next table includes those articles and classes which came under the revision of the schedule, and consequently contain the amounts for but one period; for this reason it is of little value beyond showing the more detailed distribution of some of the imports. This defect is, however, but temporary, since next year the new schedule will have been in operation long enough to allow of the desired comparisons. The importations for the nine months ended March 31, 1884, were as follows:

Articles.	Tons
Cotton ties	12,553
Hoops, sheets and plates of steel	1,195
Ingots, blooms and bars of steel	15,600
Wire rods of iron or steel	52,118
Wire and wire rope, iron or steel	2,701
Anvils, axles or forgings, iron or steel	728
Chains of iron or steel	817

The next table gives the values of all the iron and steel imports, including the articles enumerated in the above two tables. It is very difficult to arrive at any trustworthy results from comparisons made on a basis of the prices of the articles, because prices in prosperous times fluctuate considerably, while during periods of depression they decline so rapidly, and in many cases so unevenly, that it is impossible to reduce them to a common standard.

Articles.	Values Nine months ended March 31. 1884.	1883.
Iron ore	$980,715	$1,407,415
Pig iron	3,985,563	6,627,988
Scrap iron, wrought and cast	569,843	1,109,647
Bar iron	1,422,190	2,011,483
Iron rails	17,749	155,681
Steel rails	224,486	3,440,904
Hoop and scroll iron	7,559	199,214
Sheet and plate iron	601,666	662,080
Tin plates	13,268,806	13,046,982
Cutlery	1,557,157	1,599,016
Firearms	1,044,486	1,248,263
Machinery	937,527	1,591,845
Cotton ties, iron and steel	422,837	
Hoops, sheets and plates, of steel	185,882	
Ingots, blooms and bars of steel	1,047,557	
Scrap steel	83,549	
Wire rods of iron and steel	2,121,726	
Wire and wire rope, iron or steel	352,328	13,521,448
Anvils, axles and forgings of iron or steel	93,427	
Chains of iron or steel	86,731	
Files, file-blanks, rasps and floats	28,834	
Needles	267,230	
All other	1,664,358	
Total	$30,872,556	$46,621,916

However much these figures may impress us favorably, it is best not to be over-sanguine concerning the reduction of our imports, nor to ascribe the smaller amounts of 1884 entirely to the increase of home production. Though undoubtedly it is true that we are gradually arriving at the point where we can supply all our demand for iron and steel, yet the reduction, as shown by last year's statistics, is altogether too sudden to have been caused by our normal industrial growth, and is in reality due principally to the present unusually depressed state of trade.

The Latest Great Bank Failure in England.

Ten days prior to the troubles in Wall street the suspension of the Oriental Bank, in London, was announced. Although not wholly unexpected, the event nevertheless provoked a great deal of comment as an instance of ruin of a once flourishing banking institution through bad management, the directors having, it appears, on several occasions assumed, in an unwarranted manner, risks altogether too heavy. Coinciding as the failure did with similar disclosures in our own midst, it may not be amiss to sketch in outline the rise and fall of this great institution.

The Oriental Bank was chartered in 1851, with an original capital of £500,000 in paid-up shares of £25. Aside from its branch banks and agencies in England, the bank had 27 sub-agencies in India, China, Australia and Ceylon. The capital was later on increased to £1,500,000, and the business of the bank was so prosperous that the £25 shares sold early in 1866 for £55 In spite of the crisis and losses in India in that year it declared a 12 per cent. dividend, and continued to do so year after year till in 1876, when it was reduced to 10 per cent., and this dividend was kept up to the year 1879, when the depreciation in silver securities and the coffee crisis in Ceylon compelled it to assume the ownership of extended plantations in that island. The war on the Pacific caused the managers to sell the bank's Chilian bonds at a great loss, which they have been censured for a good deal at the time and since. Considerable losses supervened in Mauritius, leading to the acquisition of vast estates, while the business in South Africa had to be transferred to the Bank of Africa in order to limit the operations of the institution. Since 1876 the course of the Oriental Bank was steadily downward, as is shown by the following table of its liabilities:

	Deposits.	Bills due.	Notes in circulat'n.	Reserve.
1883	£6,696,927	£1,785,281	£761,100	£13,672
1882	8,245,759	2,083,115	735,527	13,672
1881	8,768,325	2,544,074	645,541	13,672
1880	8,286,219	2,328,068	602,305	13,672
1879	8,981,780	2,210,463	663,760	13,672
1878	11,894,300	6,218,765	776,321	13,672
1877	11,999,406	5,214,193	713,372	325,000
1876	11,791,026	5,687,086	775,824	500,000

The April report showed that in Ceylon and Mauritius the bank had invested in a manner which could not be liquidated £2,000,000. The directors proposed to write off as bad investments or depreciation £750,000 from the capital, and the depositors thus learned that half of the capital, which they had looked upon as security, was gone. The £25 shares—worth £13 on the 1st of May—declined, when a run had commenced on the bank's branches in Australia, to £6, and, when the suspension was announced, to £4. The shareholders—mostly officers and the widows of officers in India—not only lose their shares of £25, but have to pay as much additional to satisfy creditors to the amount of £1,500,000, these creditors receiving about 17s. 6d. in the pound sterling. As this would be utter ruin to many of the innocent shareholders, it is proposed to found a new bank, to assume the affairs and liquidation of the bankrupt concern. This new company is to be called the New Oriental Bank, Limited, with a capital of £2,000,000, in shares of £10.

The stoppage of this bank, with its many ramifications, has, as may be supposed, proved a source of considerable inconvenience to customers in the East, although, as has been shown, the business of the bank had dwindled materially during the past seven years. Twenty years ago it was the leading bank in Eastern commerce, as it had been the first Anglo-Indian establishment of the kind.

This failure, together with the occurrence in Wall street, coinciding with the founding of a colonial bank in Berlin, has given a good warning, it seems, to the founders of this first institution of the kind in Germany. The articles of this new colonial bank provide for a capital of 30,000,000 marks, with power to increase the same to 60,000,000 marks. The incorporators are authorized to conduct a banking business for promoting direct dealings in money and bills of exchange between Germany and the transoceanic centers. The bank is forbidden to issue notes, to deal in its own shares, to engage in speculative business or a business connected with real estate, to acquire or advance money on landed property, or to receive money on deposit in Germany. In other words, the new bank is to do a strictly-conducted business of opening credits for the shipment of merchandise from Transatlantic countries to Europe, and to Germany in particular, and, although it is to compete with London bankers and facilitate the drawing on Hamburg and Berlin abroad, it will, nevertheless, of course, open a branch in London likewise, inasmuch as in many instances it may be absolutely impossible to sell exchange on Germany in certain out-of-the-way localities. But the main idea is to take away from London part of the tribute which in the way of merchandise credits Germany has been paying for the past 60 or 70 years.

If strictly conducted on the non-speculative principle, as laid down in the statutes of this bank, the business will be both safe and profitable. Had the Oriental Bank of London adhered to these sound principles, it would to-day flourish perhaps even more than it did 18 years ago.

The time is probably not very distant when in New York, too, a similar bank will be founded, and commence a propaganda to divert a large portion of the drawing on London to New York. The tribute we pay London, for an example, in the Brazilian trade, is very onerous. A bank of the kind in New York would, of course, also have its London branch, but the capital being American, and the commissions and profits flowing this way instead of remaining in England, we should at least have the satisfaction of owning a concern specially created to forward American commercial interests. However good and solid our private banking houses may be, now mediating, American trade in merchandise through New York and London or Paris credits, we are not as sure about the non-speculative character of their dealings as we should be in the case of a powerful institution tied down to strict banking business by its own statutes, and regularly issuing a semi-annual or annual statement of its affairs.

After the experience gone through in May better safeguards and a more thorough control will recommend themselves on all hands. The speculative mania of the day, which contaminates so many branches of finance and trade, calls for vigorous reaction in the sense we have indicated, and the commerce of the country demands banking institutions which, while mediating dealings in merchandise, shall afford the positive assurance that managers abstain from all speculative risks.

Copper Production of the World.

Messrs. Henry R. Merton & Co., of London, have published the statistics of copper production by the principal producing countries of the world, from which we take the following table exhibiting the production for 1883 as compared with 1881 and 1882:

Countries.	1883. Tons.	1882 Tons.	1881. Tons.
Algiers	600*	600*	600*
Argentine Republic	293	800	307
Australia	12,000*	8,950*	10,000
Austria	500*	455*	455
Bolivia—			
Corocoro	3,250*	3,259	2,655
Chili	41,099	42,909	37,989
Cape of Good Hope—			
Cape Copper Co	5,000	5,000	5,087
Canada	329	221	50
England	3,000*	3,464	3,875
Germany—			
Mansfield	12,643	11,516	10,999
Other German	1,220*	1,748*	1,743
Hungary	1,000*	976*	976
Italy	1,600*	1,400*	1,420*
Japan	2,800*	2,800*	1,900*
Mexico	489	401	338
Newfoundland—			
Betts Cove	1,053	1,500	1,718
Norway—			
Vigsnaes	2,340	2,300	2,350
Other Norwegian	290*	290*	290
Peru	395	440	615
Russia	3,000*	3,000*	3,000
Sweden	800	798	995
Spain and Portugal—			
Rio Tinto	20,472	17,389	16,666
Tharsis	9,800*	9,000*	10,203*
Mason & Barry	8,000*	8,000*	8,170*
Sevilla	2,026	1,885	1,340
Portugueza	2,357	1,700	1,410
Poderosa	1,000*	800*	800*
United States	52,080	39,300	30,882
Venezuela—			
New Quebrada	4,018	3,700	2,823
Totals	193,454	174,596	159,711

The figures marked with an asterisk are estimates, but are undoubtedly based on the best possible information. The United States, it will be observed, increased their output of copper from 30,882 tons in 1881 to 52,080 tons in 1883. In 1881 they turned out but 20 per cent. of the world's production, whereas in 1883 they are credited with 27 per cent., though in the meantime the total production of the world had

advanced to 193,454 tons from 159,711 tons. In 1883 the United States take the lead as copper producers, whereas in 1881 Chili and Spain each surpassed this country, and in 1882 Chili was in the lead. The following table shows the total production of copper in the world in the past five years:

	Tons.		Tons.
1879	149,156	1882	174,596
1880	151,057	1883	193,454
1881	159,711		

This indicates steady growth for the first three years, but very rapid advances in the last two years, 1883 witnessing the heaviest production, notwithstanding the drop in prices, which made the expediency of continued operations a very grave question to many smelters.

The Canadian Government, at Ottawa, have passed an order to the effect that the canal tolls on wheat, Indian corn, oats, barley and rye shipped from Montreal or any other Canadian port east of Montreal are reduced from 20 cents to 10 cents per ton, such reduction to continue for the present season of navigation only. Thus we have a quick response to the abolition of tolls on the Erie Canal, the Canadians having become alarmed by the discovery that the Western grain traffic was being wholly diverted from them, the great Welland Canal enlargement failing in its principal object. If a 50 per cent. reduction, as above, proves to be insufficient to control the trade, it is probable that Canadian tolls will be wholly abolished In addition, the Montreal harbor commissioners are urged to remove their dues on grain, so as to revitalize the St. Lawrence route at any cost. It will be a serious matter for Canada if, after her enormous expenditure on public works, foreign shipping is compelled to abandon her ports for want of remunerative cargoes. On the other hand, is the Canadian system of finance strong enough to endure the strain, when sources of revenue are cut off, one after another, in striving to compete with the neighboring Republic? Such questions as these help on the agitation in favor of closer commercial relations with the United States. The most natural consequence of rivalry in the transportation of grain will be the enlargement of the Erie Canal into a grand waterway for shipping from the lakes to the ocean.

Pittsburgh is discussing the expediency of establishing a metal exchange. As that city is the center of the iron trade of the country, it would seem to be the very place for such an institution, if it should exist anywhere. Not only is there an immense investment of capital in the iron business in and about Pittsburgh, but the production of iron and steel is very large, and a storage company is in operation whose certificates are received at banks as collateral. A better foundation, therefore, seems to be provided at Pittsburgh for an exchange than in this city. Our local institution is apparently well established and in good running order. It is a remarkably aggressive concern, and expects, in the course of time, to control the metal trade of the country. If Pittsburgh were to organize an exchange of the same kind, however, our New York affair would very probably take a back seat.

The Pittsburgh meeting of the American Society of Mechanical Engineers, which was brought to a close on Friday, the 23d ult., was an entire success, not only as regards the reading of papers and their discussion, but also from a social point of view. It was evident from the beginning that the local committee of the society had adopted every possible arrangement to make the visit one of exceptional interest, and to say simply that they succeeded would but imperfectly describe the general excellence of all provisions that had been made. The cordial receptions met with at the different establishments visited were thoroughly appreciated, and contrasted strongly with one of the incidents of the last New York meeting—the visit to the West Point Military Academy—which was involuntarily recalled to the minds of many present also on that occasion, and which was incidentally referred to in Professor Sweet's response to the address of welcome delivered by Mr. Wm. Miller, president of the Engineers' Society of Western Pennsylvania.

The importance of the iron interest to the railroads is shown in the spirited contest recently waged for the business of the Thomas Iron Company by the Delaware, Lackawanna and Western Railroad, the Lehigh Valley Railroad, and the Lehigh and Susquehanna Railroad. For some time the Thomas Iron Company have been distributing their business among all these roads. One of them was desirous of having the entire business, and made a low bid on condition of receiving the whole of it. This precipitated a lively struggle for the heavy traffic of the iron company, with the result in favor of the Lehigh Valley Railroad, whose bid is understood to be $100,000 under the annual charges hitherto paid to the roads collectively, which amounted in some years to over $400,000.

Our advices from Pittsburgh are to the effect that the conference committee of iron manufacturers and the Amalgamated Association met on Saturday, the 31st ult., and signed last year's scale of wages, with the addition of 20 per cent. on steel nails and sheets which was demanded by the employees. This action at Pittsburgh affects rolling-mill employees throughout the West. It is not likely now that there will be a lockout at Cincinnati or any other Western point, though a few days ago the indications were strongly in that direction. Full particulars of the terms of settlement are as follows: The scale adopted is the scale which has been in force during the past year, with three additions—namely: (1.) On trains of muck or puddle rolls consisting of three or more sets, the extra hands required shall be paid by the company. (2.) For steel sheets harder than iron rolled on iron sheet rolls, the price shall be 20 per cent. above common iron prices. (3.) The price for making steel nails when harder than iron shall be 20 per cent. above the price paid for cutting iron nails, and when nails are made lighter than the specified sizes in the scale the price shall be advanced in proportion.

The foreign trade of San Francisco has declined seriously this year, compared with last. The total imports during the last three months are valued at $8,500,000, which is a decrease of nearly $2,500,000, compared with the corresponding months of in 1883, and is particularly noticeable in the importations from China and Japan. The countries showing an increase are the Central American States, Tahiti, British Columbia, British East Indies, Australia and New Zealand, the Hawaiian Islands, Mexico, Dutch East Indies and Manila—all Pacific coast countries. San Francisco feels sure of obtaining the lion's share of the trade of Mexico, despite the efforts of Chicago and New Orleans, also to strengthen her position in the trade of Oregon and the Northwest.

Wages in the iron works of South Staffordshire have lately been reduced by an arbitration 3d. per ton for puddling, and 2½ per cent. on other mill and forge wages. The claim of the manufacturers was for a reduction of 6d. per ton and 5 per cent. on mill and forge wages. The award brings puddlers' wages down to 7s. 3d. The price for puddling in the North of England is 6s. 9d. During the course of the discussion it was stated that shinglers were earning 24s. 7½d. per day, net; sheet rollers, 24s. 10½d., net; heaters for sheet rollers, 14s. 10½d; shearers, 12s. 6d.; forge rollers, 14s. 2d. per day.

Mr. Beer's new form of friction brake, described and illustrated elsewhere in this issue, while similar in its general arrangement to the well-known Prony brake, embraces some features of unquestionable interest. The method of using suitably curved arms and friction rollers to automatically increase or decrease the grip of the brake-band, according as the horizontal levers tend to move either downward or upward, and in this way to prevent excessive oscillation, is ingenious, and will readily commend itself.

France is losing no time in turning her Eastern conquests to some practical account. She is gradually taking Madagascar within her embrace, now that troops can be spared from Tonquin for this purpose, and at this latter point she is proceeding to establish commercial relations without delay. A differential duty of 25 per cent. will probably be collected on all foreign imports. France thus holds the key to Southern China.

WASHINGTON NEWS.

(*From Our Own Correspondent.*)

WASHINGTON, D. C., June 3, 1884.

It has been agreed between the two parties of both Houses of Congress that no business involving party division will be considered pending the absence of so many of their members in attendance at the Republican National Convention at Chicago, which will be held to-day. No less than 20 Senators, 10 of whom are Members of the National Committee, and 40 Members of the House, left here last Friday to take part in the choice of a Republican Presidential nominee.

THE HEWITT BILL.

Representative Hewitt, of New York, in a conversation with the correspondent of *The Iron Age*, took a very hopeful view of the prospects of his bill. He said: "The sub-committee of the Committee on Ways and Means, appointed to consider the bill I introduced some days ago, to remedy the administrative defects of the tariff act of 1883, and to readjust customs duties and to repeal certain internal taxes, having completed their preliminary work, which consisted of disposing of the first part of the bill, have sent it to the printer. This portion of the bill contains nothing beyond the question of administration, and is confined to the recommendations contained in the letter of Secretary Folger on that subject. It is proposed, as soon as this part of the bill is returned, to submit it to the general committee for their consideration. The matter of customs duties will be taken up separately and will be disposed of in due time."

"What do you think of the probability of renewing the consideration of the question of rates at all?" said your correspondent. "As to that," said Mr. Hewitt, "I can only speak for myself. After the experience of a few weeks ago there may be some difference of opinion as to the wisdom of reopening that question. It is possible, however, that the action of the Republican convention on the tariff question may have some effect in determining this action of the committee on this point. There is no use denying it—the tariff will be the real issue of the campaign, and the Democrats of the committee would naturally wish to put their position in some tangible form. What they will do I cannot say, but I favor a proposition in the shape of a bill, if that be possible, to cover the whole part, and which will not lead to the distractions caused by the last one attempted."

Mr. Hewitt, expecting to be absent from the city for a few days, thought that that portion of the bill now ready would go over until his return. In continuing the conversation Mr. Hewitt said, in answer to a remark as to his position on the tariff, he being a manufacturer: "Mr. Morrison's bill was not such a measure as I should have preferred, but still it was a move in the direction of tariff reform, which I think the country demands. The bill which I submitted and which has been under consideration does not precisely represent my views. There are features about it which might be changed, but in preparing it I also considered the diverse views of the persons upon whom I would be obliged to rely for support in carrying it through, if the committee should give me a favorable report.

"I believe that we should formulate some policy on this tariff question in a bill which will receive the united support of the whole party. It will never do to go into a campaign in the shape we are now in as a party on this subject. It will not do to wait for indorsement by the Democratic Convention at Chicago, for it would be fatal to party success if there should be a split there. I think that what is done should be done right here, and that before we adjourn. This is the reason, I think, we should wait until after the Republican Convention, and, having fully ascertained the Republican position on the tariff, to make the issue on a bill formally considered in the Committee on Ways and Means, formally considered in Committee of the Whole and of the House, and formally voted upon, drawing the party lines fairly and squarely. The present bill before the committee may be modified to meet all classes of the party who are expected to support it. For my part, I shall do all I can to promote harmony, and for that reason shall conform to the wishes of my party friends."

MR. MORRISON'S POSITION.

It is generally believed that Mr. Morrison will oppose any further attempt to revive the tariff question during the present session. He is thoroughly convinced that the 41 Democrats who voted to kill his bill will never consent to any tariff legislation which will be satisfactory to the revenue reformers, and unless a bill can be formulated which he and the wing which he represents are satisfied with, he would rather allow the question to remain as it is, and thus go before the country charging the opposing wing with the responsibility of his failure. Another reason stated is that, if he permits a tariff bill to be brought into the House, the same influences which defeated his bill will amend and formulate a measure which he and his friends will not support.

ABOUT ADJOURNMENT.

Should Mr. Morrison's line of policy be pursued and no further tariff legislation be undertaken, it is not improbable that Congress will be ready to adjourn by July 1. Mr. Randall has always maintained that the appropriation bills would be ready for the attention of the Senate by June 1. He has so far succeeded that there remain but two bills undisposed of by the House. There is, however, a vast amount of important legislation undisposed of, but it is evident that the leaders of the majority do not intend to prolong the session on that account In the Senate there may be some delay growing out of differences in Conference Committee on the Naval and Post Office Appropriation bills, and also on the Legislative and Executive and Consular and Diplomatic bills. In all of these bills the Democrats have made such sweeping reductions that the Republican Senate will never consent to their adoption. This they have already indicated by restoring many of the original items. Should the House sustain the action of their committee a deadlock seems to be inevitable. There are some who believe in prolonging the session beyond the time of the conventions, in order to indulge in a political discussion.

THE AGRICULTURAL BILL.

To the Senate Mr. Hale submitted the conference report on the Agricultural Appropriation bill. Mr. Hale stated that the House had yielded to the wishes of the Senate relating to the appropriations for the cultivation of raw silk, and experiments regarding the extraction of sugar from sorghum, while the Senate had receded on the item relating to artesian wells. The report was agreed to.

CANADIAN RECIPROCITY TREATY.

Messrs. Hitt, Clemonts and Belmont, of the House Committee on Foreign Affairs, have agreed to report to the full committee a measure authorizing the President to open negotiations with the Government of Great Britain for a renewal of the Canadian reciprocity treaty.

INTERNAL REVENUE COLLECTIONS.

The collections of internal revenue during the first 10 months of the fiscal year ending April 30 amount to $99,164,745, a decrease of $19,908,627 from the collections for the corresponding period of the previous fiscal year. The principal decrease was on tobacco, $13,220,698; on banks and bankers, $3,742,337, and on miscellaneous, $6,411,221. There was an increase of $12,460,564 from collections on spirits.

MR. HISCOCK MOVES TO REDUCE INTERNAL REVENUE TAXES.

June 2.—Mr. Hiscock moved to suspend the rules and pass a bill repealing the internal revenue taxes on tobacco, allowing the use of alcohol free of tax in the arts and manufactures, and repealing the tax on brandy distilled from fruit. Mr. Cosgrove at once moved to adjourn. Mr. Hiscock in vain tried to have the bill read at least. The point of order he made for this purpose was decided against him, and the vote on the motion to adjourn ordered to be taken by yeas and nays. The motion to adjourn was carried by a majority of seven. The bill remains, however, as unfinished business, and as such can be called up whenever it is in order to suspend the rules—that is, on the first and third Monday in every month and on the last six days of the session.

A PROPOSED AMENDMENT TO BANKING LAWS.

Mr. Buckner introduced a bill providing that no certificate of increase of capital stock shall be issued by the Comptroller of the Currency until he is satisfied that the increase is needed by the business of the association, and is not made to pay existing liabilities or to avoid assessment on the stockholders to make good any impairment of the capital stock of the association. The making of loans or discounts by an officer of the bank without the authority of the directors is added to the list of misdemeanors enumerated in Section 5209, punishable by imprisonment for not less than five nor more than 10 years. In the reports of their condition the banks are by this bill required under the head of resources to state separately the loans and discounts considered to be good, those suspended, overdue and doubtful, and those overdue and unpaid more than six months. The comptroller is authorized to call for a special report at any time upon the written request of stockholders representing one-fifth of the capital stock of the association.

Receivers for the Reading Railroad.

An order was made in the United States Circuit Court, at Philadelphia, on the 2d inst., appointing receivers for the Philadelphia and Reading Railroad and Coal and Iron companies. The plaintiff in the suit upon which the decree was made was Henry C. Kelsey, of New Jersey. Messrs. Stephen N. Caldwell, Edwin N. Lewis and George de B. Keim were appointed the receivers, and they were ordered to file their individual bond for $500,000, which they did.

President Keim issued the following official announcement from the company's main office Monday afternoon:

"*To the shareholders and bondholders of the Philadelphia and Reading Railroad Company:* I think it is due to all interested in the securities of the company to say that no apprehension should be felt in consequence of the appointment of receivers, the company having cheerfully acquiesced in the application for a receivership, believing it a wise and prudent measure for the protection of every one owning either the stock or bonds of the company.

"GEORGE DE B. KEIM, President."

A. J. Drexel & Co. on Monday morning announced that they would buy at par the interest coupons of the consolidated mortgage bonds of the Philadelphia and Reading Railroad, due in 1911. The total amount of interest due now is about $600,000, and as many trust and charitable institutions hold these bonds, the default on the part of the Reading Railroad Company would have caused serious embarrassment.

The receivers have issued a circular formally announcing that the business of both companies will be conducted by them, and that all officers, agents and employees of both companies will be continued in their respective positions. The circular says the wages' certificates heretofore issued by the railroad company and the obligations for supplies, materials and labor issued in May by both companies will be redeemed at maturity by the receivers out of the income of the properties. All overdue wages of both companies not yet settled for by wages' certificates will be paid in cash, due notice being given of the times and places of payment.

SCIENTIFIC AND TECHNICAL.

Air Compression by Water-Power.

At Little Quinnesec Falls, on the Menominee River, Michigan, says the Marquette *Mining Journal*, operations were begun by the Hydraulic Power Company, in the fall of 1882, by deepening an inlet from the stream just above the falls, which latter are formed by the river breaking through a range of green-stone bluffs. The river flows through this break in an almost northerly direction, falling 60 feet over a series of cascades, into a broad channel or bay below, where it turns abruptly east again. A coffer-dam having first been built at a suitable point in the stream, to control the flow of the water, rock was taken out until a width of 75 feet was obtained at the mouth of the inlet, and of 53 feet at the bulkhead, with a depth of 12 feet at low-water and 20 feet at high-water mark. The bulkhead was then put in, the timbers of the structure resting upon a foundation of immovable rock and being embedded in solid masonry, as well as stayed by massive drift-bolts. In the bulkhead were placed eight gates, each 5 feet wide and 8 feet high, working in slides by a rack-and-pinion movement fastened to the tongue.

The flume, which abuts squarely against the bulkhead, is 50 feet wide by 14 feet deep, and is 650 feet in length, the intention being to further extend it as this becomes necessary. The mud-sills supporting the flume are placed at intervals of 4 feet, and are laid in solid masonry. Upon these are raised the sets for the framework, which are strengthened to resist lateral pressure by 1½-inch stay-bolts, running through from side to side. The sides and bottom are planked with tongued and groved 2-inch stuff, this making it perfectly water-tight. At a distance of 550 feet from the bulkhead, an opening 6 feet high and 12 feet wide leads into the penstock, protected by four gates, each 3 feet wide and 6 feet high. One of these gates is operated by a rack and-pinion movement, the others floating. In front is placed an iron grating, to guard against floating rubbish being carried into the penstock, and through it to the water-wheels. At the mouth of the penstock is a slide-valve, operated by a screw, and by which the water may be regulated or entirely shut off. The penstock is a wrought-iron pipe, 7 feet in diameter, constructed of ¼-inch boiler plates, strongly riveted. This conducts the water from the flume to the wheel-box, and through it most of the fall of water is obtained. Such ample provision was made in the construction of the flume and bulkhead that of the eight gates only the equivalent of one and a third are open now, and this is found sufficient to furnish all the water required.

To give an idea of the working of the plant, it may be well to state here that the foundation of the compressor-house was built so as to leave pits, or chambers, 18 feet across, at intervals of 32 feet. They extend clear across the building, and are 22 or 23 feet deep. Near the bottom, and at the end nearest the flume, is placed the wheel-box, which contains the water-wheels. The wheels are keyed to vertical jack-shafts, the lower end of which rests and turns upon a step, or nigger-head. Each wheel is surrounded by a casing, containing veins, or doors, a few inches apart, which are operated from the compressor-house, and by means of which the water supply can be regulated or entirely shut off from the wheel. The water, after passing to and through the wheels from the penstock, is discharged through the lower end of the wheel pit. The upper end of the jack-shaft is held in place by a bearing securely fastened to a heavy angle-iron grider, the ends of which are supported by massive cross-beams of the same material, these resting in turn upon heavy angle-iron shoes 21 feet long by 4 feet wide and 8 inches thick. On the upper end of the jack-shaft is keyed a bevel gearing, which imparts motion to a horizontal shaft. This in turn transmits motion by a pinion 6 feet and a gear-wheel 14 feet in diameter, both having 24-inch faces, to a shaft upon which the crank heads of a pair of compressors are keyed, and thus the power obtained from the stream in the manner described is brought to bear upon the air-compressing machinery. All the shafts are supported and bolted in place in the most secure manner, every possible precaution having been taken to guard against twisting or shaking, so that the machinery may do its work with the minimum amount of friction and wear. Two pairs of compressors are used, these being of the well-known Rand Drill Company's manufacture. The cylinders are 32 inches in diameter, with 60-inch stroke. At present they are running the water-wheels at the rate of 150 revolutions a minute, this giving 40 strokes of the compressors in the same interval, and at that rate the two machines have a compressing capacity of 2,300,000 cubic feet of air in every 24 hours, whose equivalent in physical energy, measured by the usual rule, is 1000 horse-power, theoretical, or about what the original estimates allowed would be required to drive all the mining machinery of the Chapin, Ludington and Emmet Iron Company's mines.

At present the plant is found to be just equal to the task of furnishing air to drive the machinery at the mines served, owing to the character of the engines used at the mines, but it is the company's intention to put in another water wheel and a third pair of compressors as soon as these can be furnished by the manufacturers, the order for this addition to the machinery having been placed some time ago. It is expected that they will be received and put in place some time the coming summer. When the company's plant is thus reinforced, all the air required can be furnished uninterruptedly.

The compressor-house is a neat stone building, 100 feet long by 60 wide, and will afford room for the third pair of compressors when they are received. The line of 24-inch pipe which conducts the air from the compressor plant at the falls to the mines is 2⅞ miles long. The pipe is supported by stands 58 feet apart, each carrying a roller upon which the pipe rests. Expansion joints have been inserted every 580 feet. These allow a play of 13 inches, while not more than 7 inches is the estimated difference between the length of each 580-foot section under the influence of summer heat and winter cold; so it will be seen that trouble from this source is very effectually provided against. The pipe was laid on a line having very few angles. It has an up grade from the falls to within a few hundred feet of the Chapin Mine, at Iron Mountain, from which point it descends rapidly to the track of the Menominee River branch railroad, where a 12-inch pipe leads to the Ludington Mine, and which supplies the Emmet and Ludington with air to drive their hoisting and pumping machinery. This vast undertaking has called for an expenditure of $325,000. The work done has been under the direction of Mr. T. W. Orbison, who is a young civil engineer of practical sagacity and skill. Mr. Conro, who planned and has had supervision of the work as the immediate representative of the company, is entitled to a large share of credit for the successful manner in which the gigantic project has been brought to a satisfactory issue.

The Dynamo and the Telegraph.

Trials have recently been made at Berlin of dynamo currents for the working of the telegraph lines, says *Engineering*, and have proved quite successful. The current was furnished by a continuous current Siemens machine, having its electro-magnets excited by a small dynamo. The machine had a difference of potential of 40 volts and supplied 12 subterranean and 2 aërial lines with Hughes' apparatus, together with 11 subterranean lines and 12 aërial lines with Morse apparatus, and, lastly, 3 lines on closed circuit. It was found that the work could be done very well on lines which required from 25 to 80 cells to work them, and that there was a slight gain of speed on the subterranean lines. It would appear on the whole that dynamos will be useful in large stations, where they will effect a notable economy in cost of current; but for small local offices the battery is the most convenient apparatus.

Machinery has done much in America in cheapening the cost of agricultural products, but the limit of efficiency in that direction has by no means been reached. The vast prairies of the West would seem to be specially adapted by their level surface to the operation of steam plows, yet thus far but little progress has been made in the substitution of steam for horses. Experiments have been frequently made of a favorable nature. Last week, at Fargo, Dak., a traction engine drew eight plows, turning a sod 4 inches thick as evenly and well as could be done by horse-power, and at a rate of over 25 acres a day. As the cost of steam plowing is rated at about $1 per acre by these experimenters, as against $3 by horse-power, the adoption of steam plowing ought to proceed rapidly.

The French Government have resolved to celebrate in an imposing manner the centenary of the beginning of the French Revolution. They will also endeavor to make especially brilliant the exhibition to be held in Paris in 1889.

GOODELL COMPANY.

WHITE MOUNTAIN HAMMOCK CHAIR.

THE White Mountain Hammock Chair differs from all other stationary or reclining chairs in that it is *better, stronger and simpler*, is adapted to the house, lawn, porch or camp, and is just chuck full of quiet comfort and blessed rest. Is far superior to the hammock in every way, and can be put up so as to be always in the shade.

By its peculiar construction it is balanced in all positions, requiring no fastenings to keep it in place. The foot-rest can be quickly and easily adjusted to suit the shortest or tallest persons. The seat is made of strong canvas, fitting perfectly the entire length, without drawing the clothing tightly around the body, thus making it much cooler than a hammock; while the annoyance of catching buttons, tearing down the ladies' hair, or in any way displaying the limbs, is avoided.

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After thoroughly testing several different styles of stands for this purpose, we have no hesitation in recommending this stand as the best thing of its kind. It is durable and strong, and yet so light that a child can handle it with ease. Can be quickly and easily taken apart and folded into a compact, portable package, 3 inches square, and it will be noticed that no extra ropes or fixtures are required, except those on the chair. The price is so low that nearly every one who has a Hammock Chair can and will afford to have one.

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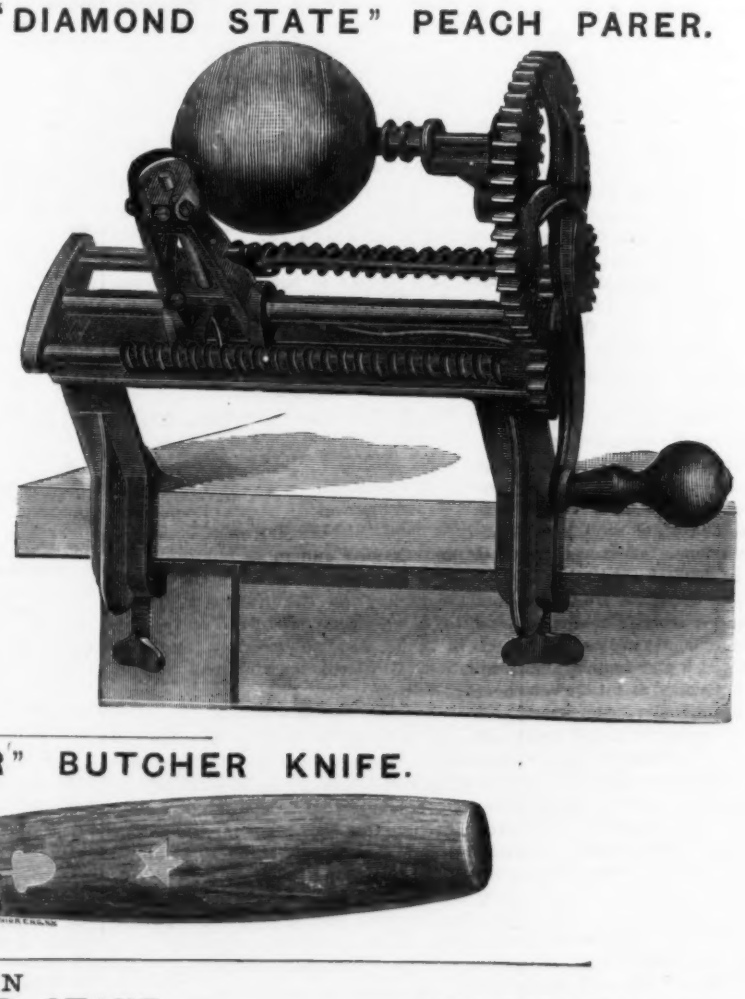

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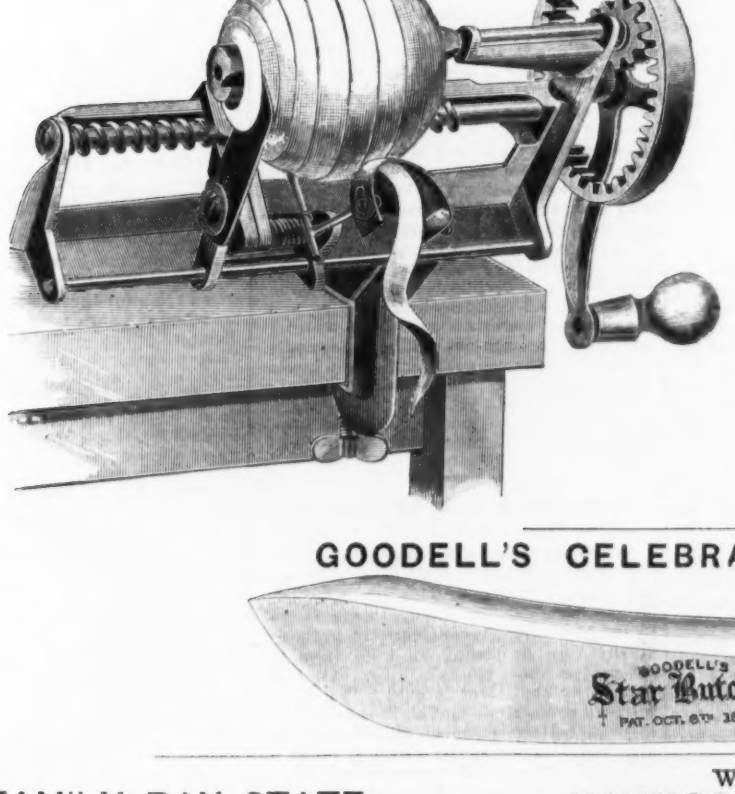
APPLE PARING, CORING and SLICING MACHINE.



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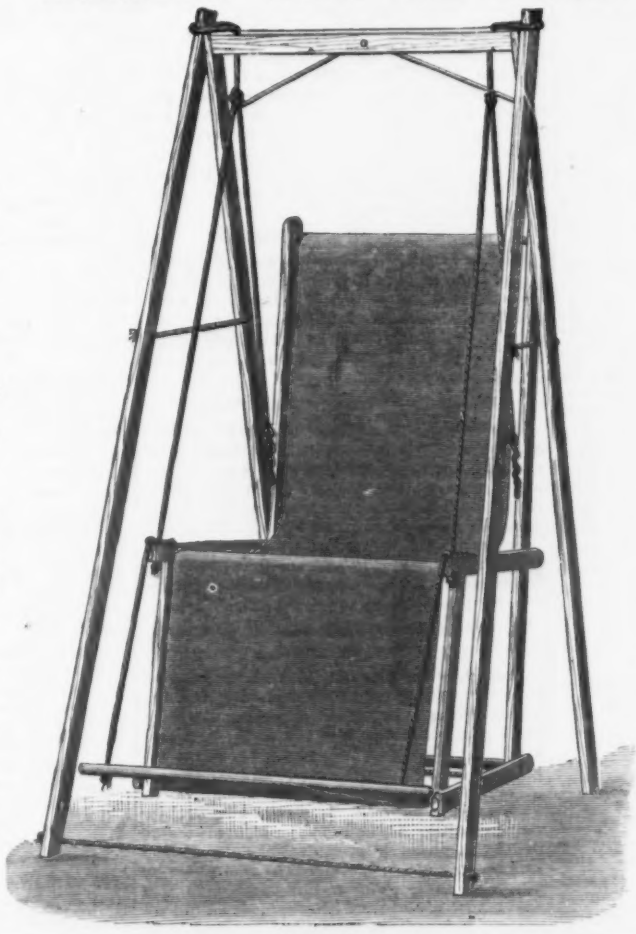
HAMMOCK CHAIR AND STAND.



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THE

Iron Age Directory

AND

Index to Advertisements.

Special Notices.

RECENT BOOKS.

Greenwood.—Steel and Iron. Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mill, the forge and the foundry. By W. H. Greenwood; 97 illustrations, 536 pages, 12mo, cloth. . . $2

This work satisfactorily presents in convenient form the most important processes employed in the manufacture of iron and steel. The illustrations are in most cases reduced from actual working drawings. The style is simple and clear. Although many of the recent improvements in American practice have not received the thorough attention which they merit, the book treating more particularly of English practice, the author has succeeded in producing a comprehensive manual for the technical student, and an intelligible and valuable assistant to the practical iron-worker. The chapter headings are as follows:

Explanation of Terms; Refractory Materials, Crucibles, &c.; The Ores of Iron; Metallurgical Chemistry of Iron; Cast or Pig Iron; The Production of Pig Iron; The Blast Furnace; Hot-Blast Stoves, Hoists, Lifts, &c.; Fuel, Blast, Charges, Yield and Waste Gases of the Blast Furnace; Castings in Iron, Foundry Appliances, &c.; Malleable or Wrought Iron; The Production of Malleable Iron Direct from the Ore; Indirect Methods for the Production of Malleable Iron; The Production of Malleable Iron in Open-hearth Furnaces; Refining of Pig Iron; Puddling; Mechanical Puddling and Rotary Puddling Furnaces; Forge and Mill Machinery, Furnaces, Plant, and Operations; Steel and Ingot Iron; The Methods Employed in the Production of Steel Direct from the Iron Ore and by the Carburization of Malleable or Bar Iron, by the Decarburization of Pig Iron in the Finery or in the Puddling Furnace, by the Fusion of Pig Iron with Malleable Iron or with Iron Ores in the Open-Hearth Steel-Melting Furnace; The Bessemer or Pneumatic Process for the Production of Steel from Pig Iron; The Basic Process for the Conversion of Phosphoric Pig Iron into Steel in the Bessemer Converter; The Production of Homogeneous Steel Ingots, Fluid Compression of Steel, Compound Armor Plates, &c.

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This volume, the third of a series designed to extend accurate information upon technical matters in a cheap and convenient form, contains a large amount of useful facts, instructions and hints upon the alloys and metals. Their modes of occurrence, properties, characteristics and general principles of manufacture are concisely presented; over one-quarter of the book is devoted to the practical applications of electricity. The important subjects included under this head are alarms, batteries, bells, carbons, coils (induction, intensity and resistance) dynamo-electric machines, electrical measurements, microphones, electric motors phonographs, photophones, storage of electricity, and telephones. It is claimed that the articles pre-ented are brought down to recent dates. Much valuable matter which has hitherto appeared in scattered publications is here collected and rendered accessible. This collection and the two preceding volumes are recommended to manufacturers, mechanics and amateurs.

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For Sale.

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22 New Church St., Room 7, New York City.

For Sale.

A First-class Hardware, Stoves, Tinware, Agricultural Implements, Glass and Furniture Store located in Franklin, Ohio doing a business of from twenty to forty thousand dollars per year. Object of selling, the store is in the hands of an Administrator. For further information, call on or address,

JAMES H. MILLER, Admr.
Franklin, Ohio.

Wanted.

By a married man with a large acquaintance with the trade of Minnesota, Dakota, Montana, and part of Wisconsin, also Province of Manitoba, a position to represent Manufacturers of Hardware either on commission or salary, with headquarters at St. Paul or Minneapolis. Experience of more than twenty (20) years in the trade.

Address, "M."

Lock Box 57, Alexandria, Minn.

Satisfactory references if desired.

Special Notices.

New & Second-Hand Machinery

NEW.

1 Engine Lathe, 10 in. x 3½ ft.
1 each, Engine Lathes, 11 in. x 4 and 5 ft.
1 each, " " 13 in. x 5, 6 and 8 ft.
1 Engine Lathe, 14 in. x 5, 6 and 8 ft.
1 " " 16 in. x 6 ft.
1 each Engine Lathes, 16 in. x 6, 7, 8 and 10 ft.
1 Engine Lathe, 18 in. x 6, 8, 10 and 12 ft.
1 " " 20 in. x 8, 10, 12, 14 and 16 ft.
1 " " 22 in. x 8, 10, 12, 14 and 26 ft.
1 " " 24 in., any length of bed to 26 ft.
1 " " 26 in., " " 26 ft.
1 " " 28 in., " " 46 ft.
1 " " 28 in., " " 26 ft.
1 " " 30 in., " " 28 ft.
1 " " 36 in., " " 29 ft.
1 " " 42 in., " " 26 ft.
1 " " 48 in., " " 29 ft.
1 " " 14 in., x 4, 6 and 8 ft. Rod feed only.
1 each, Turret Lathes, 13 and 14 in. x 6 ft. x 6 ft.
1 Fox Turret Lathe 11 in. x 6 ft.
1 Fox Lathe, 14 in. x 5 ft. Round Arbor.
1 Fox Lathe, 15 in. x 6 ft. Square Arbor.
1 each, Hand Lathes, 11, 12, 15 and 18 in. swing.
1 Iron Planer, 18 in. x 18 in. x 3 ft.
1 each, Iron Planers, 20 in. x 20 in. x 4 and 5 ft.
1 Iron Planer, 24 x 24 x 6 ft.
1 each Iron Planers, 26 in. x 26 in. x 7 and 10 ft.
1 Iron Planer, 30 x 30 in. x 10 ft.
1 " 36 in. x 36 in. x 10 ft.
1 each, 16, 20, 22, 23, 25, 28, 30, 34 and 38 in. Upright Drills.
1 each, Nos. 2, 3, 4 and 6 Spindle Gang Drills.
1 each, 8, 10, 12, 15, 18 and 24 in. Shapers.
1 each, No. 1, 2, 3 and 4 Milling Machines.
1 No. 2 Milling Machine, Lincoln Pattern.
New Pattern Milling Machine, Grant & Bogert.
1 each, Nos. 2, 4 & 5 Wire Feed Screw Machines.
1 each, Nos. 3 and 7 Spindle Nut Tapper.
1 Boring and Turning Mill, each 40 and 72 in.
1 Gray's Screw Machine to take all sizes to 1 in.
1 30-in Gear Cutter.
1 Grant & Bogert Cutter Grinder.

SECOND-HAND.

1 Engine Lathe, 15 in. x 6 ft. Wood & Light.
1 " " 15 in. x 6 ft. Chelsea Machine Co.
1 Engine Lathe, 24 in. x 8 ft. Taper Attachment.
1 Planer, 24 in. x 24 in. x 6 ft.
1 " 26 in. x 20 in. x 5 ft.
1 " 50 in. x 50 in. x 17 ft.
1 Crank Planer.
1 10-in. Shaper.
1 2-Spindle Edging Machine.
2 Lincoln Pattern No. 2 Millers.
1 Bolt Cutter, 10 sizes to 1 inch.
1 Second-Hand "Sellers" Miller.
1 " " "Brainard" "
1 " " Universal Miller, good as New.
1 Plain Upright Drill, 30 in. swing, Wood, Light & Co.
1 " " " 40 in. "

All kinds Machinists' Tools and Supplies.

NEW YORK AGENCY OF
THE TANITE CO., GRANT & BOGERT MACHINE TOOL WORKS,
and for the NEW POLISHED SHAFTING.

H. PRENTISS & CO., 42 Dey St., N.Y.

Imported Gas Engine For Sale.

One 15 H.-P. imported Otto Gas Engine, in perfect order, and the finest finished Gas Engine in the country. Been in use about 16 months. Can be delivered at once.

Inquire of GILBERT LOOM CO.,
Worcester, Mass.

For Sale,

in Dayton, Ohio, a prosperous Hardware and Iron business. Best location in city. Sales, One hundred and fifty thousand per year. Continued ill-health reason for selling. No dead stock. Invoice, $20,000.

GEO. F. ROHR,
Dayton, Ohio.

For Sale.

A controlling interest in a long-established

FOUNDRY AND MACHINE BUSINESS,

now running at its full capacity and doing well upon specialties and general work. The property consists of Land, Buildings, Tools, Patterns and stock, all in good condition, with ample water-power for all present and future demands. It is located in a district rapidly growing in manufacturing interests, and where there are unequaled shipping facilities. Only reason for selling, the demands of other business. Any other information will be cheerfully given.

Address H. F. BASSETT,
Box 1076, Appleton, Wis.

For Sale.

About 100 feet of Copper Steam-Pipe, complete with flanges; has bend at end, seven (7) inches diameter. Made of 80-pound brothers' sheet.

Address A. J. SWEENEY & SON,
Wheeling, W. Va.

Wanted.

A position by an old Hardware man and Traveler, South and Southwest, with a manufacturing concern.

Please address "M.,"
Care of W. H. SCOTT & CO.,
Little Rock, Arkansas.

To Manufacturers of Machinery

Having opened a large depot for the sale of Iron, Wood and Textile Machinery and Supplies, and an agency for exhibiting machinery at the Southern Exposition, which is to open in Louisville, Ky., August 15, 1884, and continuing 60 days, correspondence with manufacturers wishing to place their products in this market, and those wishing to be represented at the exposition, is solicited. Manufacturers of machinery are requested to send us catalogues and prices of their goods. KENTUCKY MACHINERY CO.,
Main St., bet. 12th and 13th, Louisville, Ky.

LOCATION WANTED.

REMOVAL OF BUSINESS.

We are looking for the most desirable location for manufacture of Agricultural Implements and Machinery Specialties. Must have unequaled facilities for securing raw materials, Iron, Coal and Lumber cheap and low freights, East, West and South, on manufactured goods.

Desirable propositions from individuals or business committees, giving all particulars advantages and special inducements offered to secure a long-established, prosperous and growing manufactory, will be considered.

Address E. W. ROSS & CO.,
Fulton, N. Y.

WANTED.

One hundred and fifty tons good second-hand T-rail, thirty pounds to the foot. Address

IRON RIVER FURNACE CO.,
Iron River, Michigan.

WANTED—Situation by a young man of experience in this line, to sell Agricultural Implements or a Hardware Specialty to the Trade: salary or commission.

Address "BOX 666,"
Pleasant Lake, Ind.

FOR SALE.—18-in. Drill Press, heavy column, cut gears; 3 speed for 3-in. belt; countershaft on machine. Has lever-feed for treadle. Suitable for fence work or Builders' Iron Work.

A. G. BROOKS,
261 N. 3d St., Philadelphia.

Special Notices.

CREDITS.

EALY'S "BLUE BOOK,"

JUST PUBLISHED,

contains the names, address, financial standing and paying qualities of over **150,000** dealers in

Hardware, Iron, Metals, Machinery, Cutlery, Guns, Brass Goods, Machinists, &c.,

IN THE UNITED STATES AND CANADA.

This list is NEW, having been carefully compiled within the past three months by over **20,000** Special Local Correspondents and Merchants in the Trade, at an expenditure of many thousands of dollars.

It is guaranteed to be as reliable in every particular as any Reference Book for determining credits can be made, and is much more convenient than the general Agency books, as it is condensed, being confined exclusively to this special branch of trade.

We have reliable and active local correspondents in every City, Town and Village in the United States and Canada, and can furnish subscribers with late and full written reports regarding the character, habits and ability of their customers.

This Agency is devoted to and managed wholly in the interest of this special branch of business.

The "Blue Book" is published twice a year. Terms of subscription, &c. made known on application to either of our offices

THE JOHN W. EALY COMPANY,

79 Dearborn St., CHICAGO. 51 Chambers St. NEW YORK.

To Brass Foundries.

To Brass Manufacturers.

Our new foot press, for cutting off GATES from brass castings by FOOT power, is now ready. Weight, 250 lbs. Price complete, $50, net. A boy can operate it easily. We warrant them to give the most perfect satisfaction. PEERLESS PUNCH AND SHEAR CO.,
38 N. Dey Street New York.

FOR SALE, GRAND OPPORTUNITY!

A well and carefully selected stock of Shelf and Builders' Hardware, Stoves, Furnishing Goods and a full line of first-class Agricultural implements, and agency for many of the most popular and best-introduced goods in the market. No better stock in Michigan. But one other legitimate Hardware in the city, which is located in Southern Michigan, in what is considered the *richest county* in the United States; has a population of 13,000 inhabitants, and manufactories of all kinds. The stock will inventory to-day at about $20,000; terms of sale, present cash and carriage. Proprietor must dispose of this stock, as he has large *outside* business which commands his *undivided personal* attention. The Hardware business has been conducted for about 40 years on the same stand, and the store has a large and first-class line of trade. Investigation will convince one that this is indeed a rare chance (one which occurs but once in a lifetime) to secure a well-established and money-making business. For full particulars address

"OUTSIDE BUSINESS,"
Office of *The Iron Age*, 83 Reade Street, N. Y.

For Sale.

ONE LEAD PIPE PRESS, complete, with Melting Kettle and all necessary attachments for making Lead Pipe.

Also ONE SET of SHEET LEAD ROLLERS, with Tables, Melting Kettle, Crane, &c., and everything necessary for Rolling Sheet Lead.

E. B. LAWRENCE
36 Clark Street, Chicago, Ill.

WATER POWER FOR SALE

We offer for sale at a low price all our interest in the water power here, not used in our own manufacturing, amounting to not less than 200 horse-power, together with about ten acres of land adjoining the Race, making it all available for manufacturing purposes; railroad crosses right over the land within 1000 feet of station; Mill-dam and Race in excellent condition. The power is not excelled by any water power in Western New York, it being steady the year round. For particulars inquire of

ROMER BROTHERS,
Gowanda, N. Y.

FOR SALE.

Nut Punch and Bar Shear. Weighs about 8000 pounds. Strong double frame. Geared 4 to 1. Two Balance Wheels. Has a wedged adjustment worked by a screw for the die plate.

A. G. BROOKS, 261 N. Third St., Phila.

Wanted.

HEAVY CASTINGS AND ROLLS.

Wanted to buy Old Heavy Castings and Rolls of all kinds. Address

MATTHEW GILL, JR., & CO.,
1240 and 1242 North 9th street, Philadelphia.

Wanted.

Hardware Specialties for introduction to the trade and consumers. Address

FRED. SCHMIEDING,
830 N. 4th Street,
835 Broadway,
St. Louis, Mo.

Wanted.

A competent Founder for a Coke Furnace. Must be a thoroughly experienced man and competent to take charge of a modern Blast Furnace. A liberal salary will be given to the right man. "M. A. T."

Office of *The Iron Age*, 83 Reade st., New York

Wanted.

WROUGHT AND CAST SCRAP IRON, OLD RAILS, &c.

Name point of delivery.

HOGAN & ELLIOT,
411 & 413 Walnut St., Philadelphia.

Wanted—Partner,

either active or special, with $25,000 to $40,000, to join an established wholesale Hardware business in the West. A good opportunity for party desiring investment.

Address "X,"

Office of *The Iron Age*, 83 Reade St., New York.

WANTED.—A position as Manager, Correspondent or Inside Man in the General Machinery business, by a married man of 38, with many years' experience in above capacities. Can bring considerable trade, having customers in the North, South, West and Canada. Can furnish the best of reference.

Address "X. Y. Z.,"
care of Geo. H. Ball, 925 Market St., Philadelphia.

Special Notices.

NEW AND SECOND-HAND

MACHINERY.

1 Gap Lathe, 7 ft. swing, 42 ft. bed. 2d-hand.
1 Pit Lathe, 8 ft. 8 in. swing. 2d-hand.
1 Bull Lathe, 50 in. swing, 6½ ft. bet. centers. 2d-h.
1 48-in Boring Lathe, 6 ft between centers. 2d-h.
1 24 in. Boring Lathe, 8 ft bed. 2d hand.
1 Engine Lathe, 72 in. sw., 16 ft bet. centers. 2d-h
1 Engine Lathe, 30 in. swing, 18 ft. bed. 2d-hand.
1 Engine Lathe, 20 in. swing, 18 ft. bed. 2d-hand.
1 Engine Lathe, 21 in. swing, 24 ft. bed.
1 Engine Lathe, 21 in. swing, 11 ft. bed.
1 Engine Lathe, 21 in. swing x 8 ft. bed. New.
1 Engine Lathe, 20 in. swing, 12 ft. bed. New.
1 Engine Lathe, 20 in. swing, 9 ft. bed. 2d-hand.
1 Engine Lathe, 20 in. swing, 8 ft. bed. New.
1 Engine Lathe, 20 in. swing, 6 ft. bed. 2d-hand.
1 Engine Lathe, 19 in. swing, 10 ft. bed. New.
1 Engine Lathe, 19 in. swing, 7 ft. bed. New.
1 Engine Lathe, 18 in. swing, 21 ft. bed. 2d-hand.
1 Engine Lathe, 18 in. sw., 8 ft. bet. centers. 2d-h.
1 Engine Lathe, 18 in. swing, 8 ft. bed. 2d hand.
1 Engine Lathe, 17 in. swing, 7 ft. bed. New.
1 Engine Lathe, 16 in. swing 6 ft. bed. New.
1 Engine Lathe, 14 in. sw., 4 ft. bet. centers. 2d-h
1 Engine Lathe, 13 in. swing, 8 ft. bed. New.
1 Engine Lathe, 12 in. swing, 5 ft. bed. 2d-hand.
1 Engine Lathe, 11 in. swing, 5 ft. bed. New.
1 Hand Lathe, 15½ in. swing 6 ft bed. 2d-hand.
1 Hand Lathe, 12 in. swing, 4 ft bed. New.
1 Hand Lathe, 10½ in. swing, 3½ ft. bed. 2d-hd.
1 Hand Lathe, 10 in. swing, 4½ ft. bed. 2d-hand.
1 Hand Lathe, 10 in. swing, 3¼ ft. bed. New.
1 Hand Lathe, 9½ in. swing, 3½ ft bed. 2d-hand.
1 Foot-Power Hand Lathe 8½ in swing, 3 ft. bed.
1 Oval Turning Lathe 2d-hand.
1 Iron Planer to plane 38 in. x 36 in. x 9 ft. 2d-hd.
1 Iron Planer to plane 36 in. x 32 in. x 12 ft. 2d-hd.
1 Iron Planer to plane 30 in. x 30 in. x 8 ft. 2d-h.
1 Iron Planer to plane 28 in. x 28 in. x 6 ft. 2d-hd.
1 Iron Planer, 32 x 32 x 9 ft. 2d-hand.
1 Iron Planer to plane 26 in. x 26 in. x 8 ft. 2d-hd.
1 Iron Planer to plane 24 in. x 24 in. x 6 ft. 2d hd.
1 Iron Planer to plane 24 in. x 24 in. x 5 ft. New.
1 Iron Planer to plane 24 in. x 24 in. x 4½ ft. 2d-h.
1 Iron Planer to plane 22 in. x 22 in. x 5 ft. New
1 Iron Planer to plane 20 in. x 20 in. x 4 ft. New.
1 Iron Planer to plane 16 in. x 16 in. x 3 ft. New.
1 Shaping Machine, 15 in. stroke, 23 in. traverse.
1 11-in. Shaping Machine. 2d-hd.
1 9-in. Stroke Shaping Machine. 2d-hd.
1 Shaper, or Compound Planer, 10 in. stroke. Bed 8 ft. 9 in. long. 2 tables 2d hand.
1 Shaping Machine, 10 in. stroke, 15 in. traverse.
1 6 in. Shaping Machine Heavy. 2d-hand.
1 6-in. Shaping Machine. 2d-hand.
1 36-in Upright Drill Press. 2d-hand.
1 24-in. Upright Drill. B. G. & S. F. New.
1 20-in. Upright Drill. B. G. New.
1 20-in. Upright Drill. 2d-hand.
1 9-in. Upright Drill. Lever feed. 2d-hand.
1 Four Spindle Gang Drill Press. New.
1 Four Spindle Gang Drill Press. P. & W. 2d-hd.
1 Four-Spindle Gang Drill Press. Very light. 2d-h.
1 Three-Spindle Gang Drill Press. 2d-hand.
2 Bench Drills wheel and lever. New
1 Bench Drill for ⅜ in. holes, lever feed. New.
1 Suspension Drilling Machine. 2d-hd.
1 Horizontal Drill. 2d-hand.
1 Heavy Column Drill, 36 in. swing. 2d-hd.
1 Post Drill, 72 in. swing. 2d-hd.
1 Hand Post Drill, 15 in. swing, self-feed. New.
1 Hand Post Drill, 10-in. swing, self feed. New.
1 Post Drill, 20-in. swing. 2d-hand.
2 Double Head Drilling and Milling Lathes. 2d-h.
1 Pratt & Whitney Lincoln Miller. 2d-hand.
1 Lincoln Milling Machine. New.
1 Universal Milling Machine. New.
1 Power Miller, with Dividing Head. New.
1 Heavy Power Milling Machine, with Arm. New.
1 Back-Geared Power Miller, with Arm. New.
1 Column Miller, with Post Center. 2d-hand.
1 Hand Miller. New design.
1 Hand Miller and Screw Slotter, hand feed.
1 Large Gear Cutter. Cuts 20 ft. diam. x 18 in. face.
1 Gear Cutter. Cuts 32 in. diameter. New.
1 Gear Cutter. Cuts 26 in. diameter. New.
1 24 inch Slotter to cut ½ in. 2d-hand.
1 Square Arbor Fox Lathe, for brasswork. New
1 4½ in. Centering Machine. New.
1 3 in Cutting-Off Machine. New
1 4½ in. Cutting-Off Machine. New.
1 Heavy Upright Tapper for 6-in. holes.
1 Horizontal Nut Tapper for 3-16 in holes. New.
1 Bolt Cutter, 2 in. and under 2d-hand.
1 Screw Slotting Machine. New.
1 Wire-Feed Screw Machine New.
2 Turret Head Screw Machines.
1 Cutter Grinder New.
1 Twist Drill Grinder. New.
1 Surface Grinding Machine. 2d-hand.
2 Emery Grinders on stand. New.
5 Emery Grinders for bench work. New.
9 Polishing Frames, for wood wheels. 2d-hand.
1 Heavy Polishing Frame. 2d-hand.
12 Pair Polishing Stands for wood wheels. 2d hand.
1 Steam Hammer, 3½ in. x 7 in Cylinder. New.
3 Shafting, Straighteners. New
1 Power Punch to punch ⅜ hole in ½ in. iron.
1 No 53 Bliss Power Press. 2d-hand.
1 No. 18 Adjustable Inclined Power Press. New.
1 No. 10 Adjustable Inclined Power Press. New.
1 No. 2 Adjustable Inclined Power Press. New.
3 Power Presses 2d hand.
1 Small Power Press. 2d-hand.
1 Heavy Bench Screw Press, 3 in. screw. 2d-hd.
1 Screw Press. 2d-hand.
1 No. 1 Screw Press on Legs. New.
1 Large Foot Press. 2d hand.
3 Small Foot Presses. New.
1 Foot-Power Punching Press, ⅛ in. x ½ in.
1 12 in Drop Press. 2d-hand.
1 8 in. Drop Press. 2d-hand.
1 7-in. Drop Press, 6½ ft. guides. 2d-hand.
1 7 in. Drop Press, 5½ ft. guides. New.
1 Hand Lever Punch to punch 5-16 in 5-16 iron.
1 Heavy Alligator Shear, 17 in. Jaws. 2d-hand
1 Heavy Alligator Shear, 7 in. Jaws. 2d-hand.
1 Power Sheet Shear. 2d-hand.
1 Power Slitting or Circular Shears New.
1 Geared Power Slitting Machine. New.
1 Circular Shear for No. 12 Iron. 2d hand.
1 Circular Shear for No. 9 Iron. 2d-hand.
2 Squaring Shears for Power. New.
1 22-in. Squaring Shear for light sheet iron. New.
1 Squaring Shear, with open throat, for power.
1 Pair Power Bending Rolls. 2d-hand.
1 Pair Bending Rolls for hand power.
1 Double End Power Bending Machine. 2d-hand.
2 Geared Bar Iron Cutters for 1 in. iron. 2d-hand.
1 48 in. Pattern Forge, complete. 2d-hand.
1 9 x 15 Blake Crusher. 2d-hd.
2 Grindstones and Frames. New.
1 Large Lot Pulleys and Hangers. 2d-hand.
1 Lot Lathe Chucks different sizes. New.
1 Scroll Saw, complete New.
1 22-in. Rotary Bed Surfacing Machine. New.
1 Gauge Lathe. Turns 40 inches long. New.
1 No. 6 Cameron Steam Pump. 2d-hand.
2 Anvils. 2d-hand.
1 Tire Bender. 2d-hand.

If the list does not contain what you want, write us.

J. M. BADGER.
49 DEY STREET, New York City.

For Sale.

Complete Machinery and Patterns for Manufacturing Sad Irons, with Trade-Mark, that commands highest price in the market for the goods. Also complete outfit for manufacturing a celebrated brand of Thimble Skeins. Apply to

THE GOULDS MFG. CO.,
Seneca Falls, N. Y.

E. BISSELL & CO.,

Wholesale Hardware Auctioneers,

83 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

LAMBERSON'S

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Hardware Price Books.

A *Revised* and *Improved* Edition of my Pocket Price Book is now in the hands of the printers. Size of book, 4 x 7 in; 250 pages; price $4.00 each.

BUELL LAMBERSON,
Drawer 28, Portland, Oregon.

Trade Report.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, June 4, 1884.

Scotch Pig.—The market is irregular We quote makers' prices as follows:

Coltness, alongside, Glasgow			56/6
Langloan,	"	"	52/6
Gartsherrie,	"	"	51/
Summerlee,	"	"	51/
Carnbroe,	"	"	50/6
Glengarnock,	"	Ardrossan	50/6
Eglinton,	"	"	44/6
Dalmellington,	"	"	47/
Shotts,	"	at Leith	51/6

Lighterage from Ardrossan to Glasgow is 1/ per ton

Cleveland Pig—Is a little weaker. We quote as follows, f.o.b. shipping ports:

Middlesboro, No. 1 Foundry		41/
" No. 2 "		39/
" No. 3 "		36/@ 36/3
" No. 4 Forge		36/

Bessemer Pig.—Market is unchanged. We quote W. C. Hematites 47/ @ 48/ for mixed lots, Nos. 1, 2 and 3, equal portions, f.o.b. shipping ports.

Manufactured Iron.—Market continues irregular. We quote at works:

	£	s.	d.		£	s.	d.
Staff. Ord. Marked Bars	7	10	0	@	.....		
" Medium "	6	5	0	@	6	15	0
" Common "	6	0	0	@	6	5	0
Hoops, 20 W. G. and over.							
" Common Best	7	0	0	@	7	5	0
" Medium	6	5	0	@	6	15	0
" Common	6	10	0	@	.....		
Sheets, 20 W. G. and under.							
" Ordinary Best	8	15	0	@	9	5	0
" Common	8	0	0	@	8	5	0
Welsh Bars	5	2	6	@	5	5	0

Steel Rails.—There is no change. Quotations for Ordinary Sections continue at £4. 17/6, f.o.b. shipping ports.

Old Rails—Are a little weaker. We quote Old D. H.'s, £3. 5/ @ £3. 7/6, c.i.f. New York.

Scrap.—The market is quiet and unchanged. Heavy Wrought is quoted £2. 12/6 @ £2. 17/6, c.i.f. New York; Bessemer Crop Ends, run of the mill, are quoted 52/6, f.o.b. shipping ports.

Copper.—The market is not so steady. We quote Best Selected. £61 10/ @ £62. 10/, and Chili Bars, £56 @ £56. 10/.

Tin—Is a trifle weaker. We quote Straits Ingots, spot, £83. @ £84, and futures, £84. 5/ @ £84. 15/.

Tin Plates.—The market is not so steady. We quote:

Tin Plates, 10x14, 1st qual. Charcoal			19/6 @ 21/6
" " 2d "			18/6 @ 19/
" " 1st "	Coke		17/6 @ 18/
" " 2d "	"		15/6 @ 16/

Spelter.—No change in this market. We quote Ordinary, at shipping ports, £14. 2 6.

Lead.—No change to note. We quote Common English Pig, £11 @ £11. 10.

Freights—Steam from Glasgow to New York, 3 @ 3/6; Liverpool to New York, 5/; Liverpool to Philadelphia, 5 @ 6/6, and London to New York, 7 6 @ 9/6.

Financial.

Office of *The Iron Age*,
WEDNESDAY EVENING, June 4, 1884.

Business interests are gradually rallying from the prostration occasioned by the recent financial crisis and numerous disastrous failures resulting from stock speculations. But the general conditions which induced stagnation and distrust are not essentially changed. Perhaps the most cheering indication, aside from the more steady valuation of nearly all our leading securities, is the resumption of business by the well-known banking firm of Fisk & Hatch, who announce that they are prepared to pay in full all claims presented. Among other effects this action restores to the Newark Savings Bank the funds which were tied up by their suspension. The comparative ease in money is of itself a sensible relief, but as yet no quotations can be given for commercial paper, only the best being marketable. During the week the Wabash and the Philadelphia and Reading railroads have gone into the hands of receivers. The former has been long expected, but the latter was a surprise. The fixed charges due by the Reading June 2 amounted to $1,232,541, which Drexel & Co. announced themselves prepared to pay, including the New Jersey Central dividend of 1½ per cent. The accepted explanation of this movement is that Vanderbilt was pledged to keep the Reading's lease of the Jersey Central intact, and so came to the rescue.

The weekly bank statement was unexpectedly favorable, showing that the banks are gaining by the receipts from the interior. In addition to an increase of $2,102,400 in legal tenders there was a gain of $475,600 in specie. The loans were contracted $3,529,200 and deposits show a decrease of $8,214,000. The circulation shows a nominal increase. On these changes the banks gain $4,631,500 in reserve, and are now only $1,977,625 below the 25 % legal requirements.

The West Side Bank resumed business on Saturday, and during the day paid out $140,000, against deposits of $350,000. The receiver of the Atlantic State Bank, of Brooklyn, says depositors will receive nearly the full amount of their deposits. Of the Marine Bank no statement can be expected for a fortnight or longer. All claims must be presented within three months from the 21st inst., as they will be disallowed.

Suit has been commenced to compel the directors of the Pacific National Bank, Boston, to make good the deficit to that institution, amounting to $1,500,000.

Respecting the present financial situation the Comptroller of the Currency is reported as expressing a belief that it is improving. The banks in New York and other money centers lost a large part of their country deposits, but he thought that as soon as confidence is restored money will flow again into its usual channels, as it did after the panic of 1873. From all that can be learned the country banks seem to be in good condition.

The imports of foreign merchandise at this port during the past week exhibit an increase compared with the previous week their total being $8,575,163, of which $6,952,312 represented general merchandise, and the remainder, $1,622,851, dry goods. Since January 1 the imports aggregate $191,594,258, compared with $194,593,349 for the corresponding period of 1883. The imports of specie during the week amount to $177,626, and the exports $1,392,655, including $1,238,000 in Spanish gold coin for Havana. The total exports of specie since January 1 equal nearly $43,400,000.

In charging to the Grand Jury at the opening of the June term of the Court of General Sessions, Judge Gildersleeve said, evidently referring to recent events: "It is clearly manifest that offenses against property of a most aggravating and appalling character are on the increase; that a spirit of lawlessness, bred of extravagance or greed of great riches, and taking root in the numerous channels of speculation to be found in our city, has developed a class of criminals from walks of life where we might expect to find those who respect our laws and have some regard for legal obligations and the rights of others. Confidence in our corporations and great commercial houses, so essential in the conduct of business, is impaired; values are greatly depreciated and the credit of the nation threatened. While in obedience to the law we are punishing the low thieves from the sloughs and slums of the city for stealing small sums, let us not neglect the guilty in high places who steal large sums and are amenable to the same law."

The exports of merchandise from this port during the past week amounted to but $5,254,394, against $6,445,921 for the same week last year. There was a comparatively heavy movement of cotton, the total shipments for the week being almost wholly for Liverpool, and aggregating about 10,000 bales. The shipments of breadstuffs have, however, fallen off, and there was only the usual slow movement of provisions and petroleum. Since January 1 the exports amount to $123,419,630, compared with $151,156,482 for the corresponding period of 1883.

The foreign trade at this port is not in the most hopeful condition, for, while the imports are maintained at nearly or quite their full volume, the export movement is sluggish, giving little promise of a favorable turn in the rates of foreign exchange. Moreover, speculators seem determined to hold up prices above the parity of values in the foreign market, which continues dull. But yesterday there was a further decline in grain, partly due to a pressure in the West to work off the old crop, in prospect of a harvest everywhere reported to exceed that of last year. The May frost caused no appreciable damage in the grain districts. The market for ocean freights within the last day or two shows a gratifying improvement. Exporters of provisions are still holding off.

Foreign exchange is dull at an advance, due to the selling of stocks on London account. The posted rates are $4.85 @ $4.87 for 60 days and demand. The London *Economist* of the 24th ult. judges that the New York banks will be equal to any demands, and, consequently, that there is less reason to expect that gold will be taken from London to New York.

There were 148 failures and suspensions in the United States reported to *Bradstreet's* last week, as compared with 183 in the preceding week, and with 160, 104 and 67, respectively, in the corresponding weeks of 1883, 1882 and 1881. In general trade the market is slow, jobbers being particularly cautious in making new engagements, and the interruption of a holiday restricts the volume of transactions, ordinarily moderate at this season. According to returns from 26 leading clearing houses in the United States, the aggregate clearings last week amounted to $725,663,075, against $912,373,701 for the previous week; as compared with the corresponding week of last year, the clearings show a percentage of decrease amounting to 11.8 %, against a decrease of 2.5 % the previous week. Outside of New York the the clearings show a percentage of decrease amounting to 22.2 %, against an increase of 2.3 % the previous week. A satisfactory feature in the industrial situation is the settlement of wages for another year, on the old scale, in the Pittsburgh iron trade. The straw-paper makers at Albany agreed to maintain the old schedule of prices.

On the Stock Exchange during the past week prices have gravitated toward a higher range, led by the Gould specialties, which as alleged, are being supported by an agreement of leading operators. Easy money likewise helped in the improvement. On Thursday and on Saturday alike there was a substantial advance, the appointment of a receivership for Wabash making no impression, but stocks were irregular, and New York Central, Reading and Union Pacific were notably weak. The appearance of the Associated Banks' statement had as trengthening effect. On Monday there was a decided pressure to sell, under the announcement that Reading had been placed in the hands of a receiver. The resumption of Fisk & Hatch was an occasion for general congratulations. On the whole, the market gained more than it lost. On Tuesday the tendency to improvement was checked by a pressure to realize, and there was more or less selling on European account. To-day the market was feverish and irregular, partly due to weakness in London for American securities. The special features were Reading, Lackawanna, St. Paul and Union Pacific, which were active and stronger. Quotations were as follows: Union Pacific, 44¼; Lackawanna, 103⅛; Lake Shore, 85¾; Louisville and Nashville, 34½; Missouri Pacific, 82⅞; St Paul, 75¼; Western Union, 61⅜ @ 61⅞; Reading, 23¾ regular, 24; Northwestern, 101; Erie, 14⅜.

At the Stock Exchange the vacancy occasioned by the resignation of A. S. Hatch has been filled by the election of I. E. Simmons. At the Cotton Exchange Mr S. Gruner was elected president, and at the Produce Exchange the Herrick, or regular, ticket was carried by a large majority.

The Erie Canal is doing a good business, the total tons moved since the opening of navigation being 671,000 tons, against 603,000 tons for the same period last season. The east-bound movement from Chicago is the same as in the previous week. Cargoes on the lakes are obtained with difficulty. It is reported that the trunk-line managers have increased the 15¢ grain tariff to 20¢, and that other freights have been correspondingly advanced.

It is stated that Judge Van Brunt, upon application of the North River Construction Company, granted an order restraining the receiver and the New York, West Shore and Buffalo Railway Company from raising additional money in connection with the West Shore funding scheme now in progress.

The following were the closing quotations for United States bonds:

	Bid.	Asked.
U. S. 3 per cents	100¾	101
U. S. 4½s, 1891, coupon	111¼	111¼
U. S. 4s, 1907, coupon	123⅝	120¼
U. S. Currency 6s, 1895	121	—
U. S. Currency 6s, 1896	125	—
U. S. Currency 6s, 1897	127	—
U. S. Currency 6s, 1898	129	—
U. S. Currency 6s, 1899	131	—

Metal Market.

Copper.—In common with other metals and merchandise generally, Copper has become excessively dull. Consumers still sufficiently stocked, most of them only operating from hand to mouth, so that during the week under review not over 150,000 lb Lake Superior sold at 14⅛¢ @ 14¼¢, which is also the closing figure, while other brands keep within the range of 13¼¢ @ 13½¢. There are so many subjects of public interest just now diverting the attention of business men, and we are so close upon the dull summer season, that Copper, low as it seems to be, attracts little notice, and, left to itself, it shows little inclination to buoy up again. Manufactures may be nominally quoted as under: Bottoms, 20¢; Brazier, 20¢; Sheathing, 18, and Bolt Copper, 20¢. There is a good deal of shading. London cabled the last few days Best Selected, £62, and Chili Bars, £56. 10/, while to day we receive thence the ensuing cable message: "Market not so steady. Best Selected, £61. 10 @ £62. 10/; Chili Bars, £56 @ £56. 10/."

Tin.—London has kept unusually steady, while here we have been very quiet at .85⅝, Straits, large lines, and 18¼ jobbing. Shipments from the Straits settlements to England and the United States in May have been 1700 tons, and from Australia 600. Now that the 10 % discriminating duty is levied no more, it is impossible to tell precisely what out of the above cabled amounts has gone to England and what to the United States; hence, instead of furnishing particulars about which we do not feel sure, we shall henceforth always give the totals merely. London came this morning, per cable, £33. 10/, Straits Tin, and Singapore, £84. 10/, cost and freight per steamer to New York. This afternoon we receive over the wires from London the following: "Tin is a trifle weaker. Straits Ingots, spot, £83 @ £84; futures, £84. 5/ @ £84 15/." *Tin Plates.*—Our market continues quiet and slightly in buyers' favor; large buyers are holding off for the moment, expecting to get in at lower prices later on. We quote at the close, large lots, ordinary brands, per box: Charcoal Bright, $5.25 @ $5 75; do. Ternes, $4 80 @ $5.25; Coke Tin, $4.75 @ $4 85, and do. Ternes, $4.50 @ $4 62½. Liverpool is tolerably steady at 15/ @ 15 6 for Coke, and 17/9 @ 19/ for Charcoal. From London we are told that the market is not so steady.

Lead.—Very little business has been done since our last report; first, 300 tons Corroding sold at 3.7¢; then 100 tons Common at 3.65¢ and 3.62½¢; and, finally, 200 tons Newark Common at 3.62½¢, the market closing at 3.6¢ @ 3.65¢, dreadfully dull and stagnant for both Common and Corroding. Manufactures are quoted as follows: Lead Pipe, 6¼¢; Sheet Lead, 7¼¢; Tin-lined Lead Pipe, 15¢, and Block-Tin Pipe, 45¢, less the discount to dealers. From London we receive the ensuing cablegram to-day. "No change to note. Common English Pig, £11 @ £11. 10/."

Spelter and Zinc.—Although but moderately active, Common Domestic Spelter cannot be got under 4.6¢, and is held at 4.62½¢ at the close, showing great firmness. Silesian remains nominally 5¢. Domestic *Sheet Zinc* is quiet and steady at 5¼¢; Foreign, 6¼¢; Bertha Refined Spelter is 8¢. From London we are wired to-day: "No change in Spelter in this market. Ordinary, at shipping ports, £14. 2 6.

Antimony.—But a small business is being transacted at 10½¢ for Hallett and 11¼¢ for Cookson.

Trade Report.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, June 3, 1884.

The influences of the past week have not been favorable to the Iron trade, so that the month opens with a dull and depressed feeling, indicating very little chance of improvement for the present. The financial difficulties of the Philadelphia and Reading Railroad are a leading topic of conversation, and, while the Iron trade may not suffer any direct loss, it cannot escape the feeling of distrust and depression which recent events have developed in other departments. The action of the Pittsburgh manufacturers is another source of uneasiness, as a considerable curtailment in the output of Manufactured Iron had been pretty generally calculated upon. Their surrender is understood as an indication that they intend to run as before, but where they expect to find a market for their product is a puzzle. The only thing likely to save the market from complete demoralization is a shut-down for a few weeks, and as this, in view of recent events, can hardly be regarded as among the probabilities, the outlook for Finished Iron is gloomy in the extreme.

Pig Iron—Begins to show increasing evidences of weakness. It is true that some brands are still held with absolute firmness, but these are notable exceptions. Generally speaking, sellers are disposed to shade prices sooner than lose a sale, so that while $20 @ $20.50 is quoted for good No. 1, sales are frequently made at less than $20, particularly if a portion of No. 2 can be worked off with No. 1 at about $1 less money. This is not due to any excess in supply, but sellers are anxious to keep their trade, and sooner than risk the loss of a customer, moderate concessions are granted. Mill Irons are dull throughout, and while a few choice brands are held at $18 at furnace, the majority of sellers are glad to make tidewater deliveries at the same figure. Cinder Irons are offered at all sorts of prices, from $15 at furnace upward, but meet with slow sale. The entire market, in fact, is utterly devoid of animation, and not the slightest interest is manifested beyond covering present requirements. Under these conditions it is impossible to say what the future may bring forth, although it is probably safe to assert that the changes will not be important—first, because there are no large stocks to break the market; second, because the current output is barely equal to consumption; and, third, because if prices weaken, there is more probability of a decrease in production than an increase. There is so little prospect of a movement in the opposite direction that it is hardly worth while considering it at present.

Foreign Iron.—This department is the dullest in the entire list. Buyers for the present appear to have dropped out of the market entirely. Bessemer could be had for shipment at $19 @ $19.50, and 20 % Spiegel at about $28.

Blooms.—Nothing doing except in carload lots once in a while, at about the following quotations: Charcoal Blooms, $53 @ $55; Run-out Anthracite, $43 @ $45; Scrap Blooms, $40 @ $42; Northern Ore Blooms, $38 @ $40.

Muck Bars.—Demand very light, but prices are nominally as before, say $31 @ $32 at mill according to quality. Only very small lots can be placed, and these chiefly at inside quotations.

Bar Iron.—The demand has been limited for some time past, and prospects are by no means encouraging for much increase. The mills have been fairly well engaged of late, in anticipation of the usual slackening up during the heated term, but the demand is of that uncertain character that there is a constant fear of its stopping short off at any moment. The action of the Western iron masters in signing the scale is not regarded as likely to help matters for the present, although in the long run it will doubtless be better for the Eastern trade than the lower scale would have been. In any event, it is not easy to see where a market can be found for a large production, as buyers seem determined to take only just such small lots as are required for present uses. Lowering the price brings no increase of business, so that in that sense concessions are not to be desired. Prices are nominally 1.9¢ @ 2¢ for Best Refined Iron, Medium at 1.75¢ @ 1.85¢, but at best business is dull and unsatisfactory.

Plate and Tank Iron.—The only item of interest during the week has been the inquiry from the Atlantic Refining Company for several hundred tons Tank Iron. A portion of the order was taken at about 2¢ delivered at the company's works, and bids are out for several hundred tons more at same price. Manufacturers are badly in need of work, but there is a general disposition to hold off for about a tenth more. So far as known, there are still about 500 tons wanted at 2¢ bid and 2.1¢ asked; in fact, some manufacturers have declined to name a price against the low figures offered by buyers. For small lots quotations are nominally as before, say: Boat Plate and Tank Iron, 2.15¢ @ 2.2¢; Shell, 2.75¢ @ 2.85¢; Flange, 3.75¢ @ 3.85¢; Fire-Box, 4.75¢.

Structural Iron.—The market remains in a very dull condition, and the feeling is probably more depressed than at any time during the year. The action of the Pittsburgh manufacturers in signing the scale has had an unfavorable influence, and business is bid for at lower rates than have been known for a very long time. Inquiries are not numerous or important; probably 1000 to 1500 tons, all told, would represent the actual amount of business offered during the week Prices are weak, but nominally as last quoted, viz.: Angles, 2.1¢ @ 2.2¢; Bridge Plates, 2.25¢; T's, 2.75¢; Beams and Channels, 3.5¢, less the usual discount on large orders.

Sheet Iron.—There is a fairly active demand, but not by any means what is usually expected at this season. Prices are weak, and buyers appear to be holding off for lower quotations. For small lots of the best makes prices are about as quoted (but medium and inferior grades are available at much lower figures).

Best Refined, Nos. 26, 27 and 28	4 ¢
Best Refined, Nos. 18 to 25	3½¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28	6¼¢
Best Bloom Sheets, Nos. 22 to 25	6 ¢
Best Bloom Sheets, Nos. 16 to 21	5¾¢
Common Red Plates, 3-16 to 16	2½¢ @ 2.6¢
Blue Annealed	2.6¢ @ 2¾¢
Best Bloom, Galvanized, discount	50 %
Second quality, discount	52½ %
Common, discount	57½ %

Wrought Iron Pipe.—Trade continues dull and prices weak. Manufacturers claim to adhere firmly to quoted rates, but dealers with large stocks are making slight concessions in order to realize thereon. Discounts are unchanged, viz.: Butt-Welded Black Pipe, 27½ @ 30 %; Butt-Welded Galvanized, 17½ @ 20 %; Lap-Welded Black, 47½ @ 50 %; Galvanzed, 32½ @ 35 %; Boiler Tubes, 47½ %.

Steel Rails.—There is no change to notice, the demand being of the same limited character as noticed for several months past. Small lots are called for pretty frequently and usually quoted at from $32.50 to $33 at mill, but for any fair-sized order there is no difficulty in obtaining concessions. Buyers are in the market for moderate quantities, but sellers are unusually discriminating in regard to payments, so that, unless the security is beyond question, there is considerable difficulty in placing the order. The mills are fairly well under contract for the next two or three months, the demand for Steel for other purposes than Rails being steadily increasing.

Bessemer Slabs—Are in fair demand, with sales at from $37 to $40, according to quality.

Crop Ends.—Foreign are held at $21 @ $21.50, ex-ship; American at $21 at mill.

Old Rails.—The market is extremely dull, as the requirements of buyers appear to have been fully met for the present. A sale of about 1000 tons Old T's was made a few days ago at $21, Philadelphia, but there are no buyers at any such figure to-day. Bids of $20 have been asked for, but even that price seemed to attract no attention. However, more money would doubtless have to be paid in case Rails were wanted, but, as they are not wanted, bids cannot be had at any reasonable figure.

Scrap Iron.—The demand is very trifling and only small lots can be sold at quoted rates, which are about as follows: Choice No. 1 Wrought, $22.50 @ $23; Cargo lots, $21 @ $21.50; Wrought Turnings, $15 @ $16; Machinery Cast, $15 @ $16; Cast Turnings, $9 @ $10.

Nails —The demand continues fairly active for small lots, but large lots are slow of sale and weak in price, and card rate said to be shaded in some cases. We quote as last, viz., $2.50 @ $2.60, according to circumstances, but prices are very irregular.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., June 3, 1884.

The collapse of the Penn Bank has had a depressing influence on general business here, which at best has been nothing to brag of for some time past. The collapse was caused chiefly by speculation in oil. The bank, it now appears, has been in a very weak condition for three or four years, although up until the day it closed its doors it was supposed to be, by the public generally, one of the strongest and best in the city. According to the statement made by the president, W. N. Riddle, large oil speculations were entered into by and with the consent of most of the directors, with the funds of the bank, in the hopes of making enough to wipe out the deficit of the bank, but, the project proving a big failure, the deficit was largely increased thereby. The president and cashier have been placed under arrest, and the statement of the president places a number of the directors in an embarrassing position. It is probable the depositors will make an effort to hold the directors, some of whom are charged with using the bank's money to speculate in oil, while others, it is alleged, gave the bank so little attention that they know little or nothing about its condition. A vast deal of trouble and litigation will be the result of this collapse, and it will, no doubt, require several years before it is got through with.

As intimated in our report of last week, the Iron manufacturers, or at least a majority of them, have signed the scale, and there will be no lockout for another year. The signing of the scale does not bind the Iron masters to keep their mills running, and it is probable the number of idle mills will be considerably increased between now and the first of July, unless business brightens up materially in the meantime. It has been apparent for several weeks that some mills working on specialties would renew the wage scale rather than shut down, having contracts that had to be filled, and, as a lockout had but little prospect of success unless all the mills were in it, it was deemed best under the circumstances to renew the old scale, and then manufacturers could run or stop as they thought best. It is thought by some that the Iron business will be better from July to January than it has been the first half of the year.

Iron Ore.—The Lake Ore trade remains much the same as noted; business, of course, continues dull, in sympathy with the general trade, although some of the Lake Ore companies are still sold ahead, having contracted pretty freely some time ago for future delivery. Prices remain unchanged: Best Bessemer Ores, $5.50 @ $6 ℔ ton, at Cleveland; freight from there to Pittsburgh, $1.50.

Pig Iron.—Notwithstanding the settlement of the wage question, trade continues very dull, and the indications are that there will not be much, if any, improvement before July, as a number of the mills, it is said, will shut down during the time specified, and they will be in no hurry about starting up unless there is a decided change for the better in the market. But the indications are that the same hand-to-mouth policy will be closely adhered to for some time to come. However, while the outlook at present is not encouraging, stocks are light and production is down to very moderate proportions, and the probability is that the number of idle furnaces will be increased within the next few weeks, or as soon as existing contracts are completed. We quote prices as follows:

Neutral Mill Iron	$16.50 @	17.50,	4 mos.
All-Ore Mill	18.00 @	18.50,	4 "
White Mottled	16.00 @	16.50,	4 "
Silvery Iron	17.00 @	18.00,	4 "
Foundry Grades	18.00 @	20.00,	4 "
Warm-Blast Charcoal	22.00 @	25.00,	4 "
Cold Blast, Charcoal	26.00 @	28.00,	4 "
Bessemer Iron	19.00 @	20.00,	4 "

It is said that Bessemer Iron has been offered as low as $19, cash, or, in other words, that bids have been solicited at that price.

Muck Bar.—The dullness noted from week to week for some time has continued; not enough doing to establish price. We quote nominally at $30.50, cash, to $31, four months.

Manufactured Iron.—Manufacturers generally continue to report trade as being very dull. Some of those working on specialties are pretty well employed, but those dependent upon the ordinary Merchant Iron trade nearly all complain both of a lack of orders and unremunerative prices. Those manufacturers who keep up the quality of their Iron are refusing to sell under a basis of 1.8¢ for Bars, but orders of a desirable character have been placed as low as 1.6¢ @ 1.65¢.

Nails.—The Nail trade continues light for the season; manufacturers report that there are a good many small orders, which indicates that large buyers are holding off in expectation for lower prices. We repeat former quotations: $2.25, 60 days, 2 % off for cash, for car lots, and 5 @ 10¢ ℔ keg additional in a jobbing way. The meeting of the Western Nail Association, called for last Wednesday, did not take place, no quorum being present. The stock of Nails in first hands is larger than for several years, and some of the factories have shut down, but jobbers are almost bare, and once satisfied that hard pan has been reached a considerably increased, business is sure to follow.

Wrought-Iron Pipe.—Business possibly is improving somewhat, but is still considerably short of what it should be and usually is at this season; it is probable, however, that trade will improve considerably next month. No change in card or discounts, which are as follows: On Black Butt-Welded Pipe, 30 % in carload lots, and 27½ % for less than carload; on Galvanized do., 20 % in carload lots, and 17½ % for less; on Black Lap-Welded Pipe, carload lots, 50 %; less, 47½ %; on Galvanized do., 35 % and 32½ %.

Steel.—The Merchant Steel trade continues dull, but few, if any, of the mills working full, and the indications are that it will remain so until the latter part of next month. Prices remain unchanged: Standard brands Refined Cast Steel, 9½¢; Crucible Machinery, 5¢; Open-Hearth do., 3¢ @ 3¼¢.

Steel Rails.—There have been no sales reported here for some time, and while the asking price is still quoted at $35, cash, at mill, they can be bought elsewhere at equal to $33.50 @ $34 here. The mills here are pretty well filled up with orders taken last winter, and they do not care to take orders at the low prices until they have cleared up their order books. There is more or less inquiry, and orders, it is intimated, are being held back in expectation of still lower prices.

Old Rails —The market continues very dull, no sales having been reported for some time past, in the absence of which we continue to quote at $22.50. However, now that the wage question has been settled, it is expected that there will be some inquiry for small lots before long. It is possible that purchases might be made below the price quoted.

Railway Track Supplies — Continue very dull, but prices remain nominally unchanged: Spikes, 2.35¢, 30 days; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2½¢ @ 2¾¢.

Crop Ends.—There have been no sales of Domestic for some considerable time, in the absence of which we omit quotations. The Rail mills here are working up their own production.

Scrap—Continues very dull, and dealers say there is so little doing that it is difficult to give reliable quotations. We quote nominally as follows: No. 1 Wrought Scrap, $20 @ $21 ℔ net ton; Wrought Turnings, $16 @ 18; Old Car Axles, $28 @ $29; Cast Borings, $12.50 @ $13.50, gross ton; Old Car Wheels, $18.50 @ $19, gross.

Window Glass.—At the meeting of the Window Glass manufacturers prices were advanced slightly, which may be taken as an indication that they are pretty well supplied with orders. The discount is now 60 and 10 % on Single and 70 and 5 % on Double. This gives the skilled workers an increase of about 10 % in their wages.

Coke.—The general situation remains unchanged; business is by no means active, but all that can be expected in view of the depressed condition of the Iron trade and so many idle Pig-Iron furnaces. Blast-furnace Coke is still quoted at $1.10 ℔ ton, free on cars at ovens.

Chicago.

Office of *The Iron Age*, 36 and 38 Clark St., Cor. Lake St., CHICAGO, June 2, 1884.

Hardware.—The political situation during the past 10 days has diverted attention from business, and as a consequence the market has been quiet. While the low railroad fares have brought a great many merchants to the city, they are here more to see than to buy. The detrimental influence of the financial break of three weeks ago is about over, but the advance of the season prevents the recovery of the ground lost. Purchases are made to meet current demand only. Business dealings are on a conservative basis, and thus far country merchants have been able to meet their obligations promptly, which makes the money market comparatively easy and keeps the jobbers in good humor. Prices have continued steady, no material changes having occurred during the various phases through which the market has passed within the last month. The demand for Barb Wire is on the decline and nothing of interest in this line can be noted, except that at a largely-attended meeting of the Western Barb Wire manufacturers last week it was resolved to close all manufactories from July 1 to September 1, and longer if necessary, in order to curtail the supply. It was also agreed not to sell hereafter any Wire for less than 5¢ and 6¢ ℔ lb.

Nails.—The demand for Nails during the week was fully up to the previous one. Carload orders were somewhat increased, probably in view of the uncertainty whether manufacturers would close their works on the 1st inst. The market may be considered fairly active for immediate consumption, while stocks in some sizes are short, and in general in the West not larger than necessary. Prices have been pretty steady for several weeks, but at no time has there been any great strength, but since the decision to continue in operation a perceptible weakness prevails. Carload lots are quoted at $2.45, 2 %, 60 days, and smaller lots at $2.50 by local concerns, while mills who are in direct competition have made prices to dealers in the country and towns West and Northwest that are about 5¢ ℔ keg less than the present carload figures.

American Pig Iron.—The market for Pig Iron has been very much the same as during the earlier part of the month. The demand continues to be for small lots for immediate use, at current quotations. The continuation of the Bar Iron manufacturers has a good effect on the market. The market remains firm in price, and no lower figures are looked for by consumers. Orders that are placed are easily negotiated, because it is generally understood that prices cannot be shaded on standard brands. There is no longer any prospect that the present quietness will be broken before the closing half of the year. Dealers, as a rule, have accepted the situation and confine themselves to supplying short trade. The following quotations for carload lots, four months, are unchanged: Lake Superior Charcoal, Nos. 1, 2 and 3, at $21.75 @ $22.50; Nos. 4, 5, and 6 at $23; Lake Superior Coke at $21; Lake Superior and Ohio, mixed, at $21; Ohio Standard Black Band, No. 1, $21 @ $22; Southern, No. 1 at $20, and No. 2 at $19; Silvery Soft at $19 @ $21; Anthracite, No. 1, at $22, and No. 2 at $21.

Scotch Pig.—Market quiet and prices unchanged, as follows: Summerlee, $25.50, cash, and Glengarnock, $27, four months—not firm to carload buyers.

Merchant Steel.—There is nothing different in the Steel market from what there has been for months. The greatest demand is for the "extra" brands of Steel, upon which prices are pretty generally realized. For low grades and the medium qualities prices are weak and irregular. For the Best Refined grades we make the following quotations:

	Per pound
Best Refined Cast Tool Steel	9½ @ 10¢
Crucible Cast Machinery Steel	6¼ @ 6½¢
Open-Hearth Machinery Steel	3¼ @ 3½¢
Bessemer Machinery Steel	3¼ @ 3½¢
Open-Hearth Spring Steel	3½ @ 3¾¢
Toe-Calk Steel	3½ @ 3¾¢
Bessemer Steel	2¾ @ 3 ¢
Cast Plow Steel	4½ @ 4¾¢
German Plow Steel	3¼ @ 3½¢
Syndicate Steel	0¾ @ ....
Fire-Box and Boiler Steel	5¼ @ 5½¢

Steel Rails.—Mills are taking very little new business. The demand appears to be for small lots only, upon which the mills are realizing about $37, cash. No large contracts are offering at present, if reports are reliable.

Old Rails.—The market for Old Rails has declined from 50¢ to 75¢ ℔ ton during the week. Mills are offering $19.50 @ $20, while holders are asking from 50¢ to $1 ℔ ton advance on these prices, but will likely have to meet buyers' views to affect sales.

Bar Iron.—The demand for Best Refined Bar Iron has been remarkably good when it is compared with the other branches of the Iron industry. Sales for the month of May are reported by some of the houses as having been much better than any they have had for years in tonnage. The low prices that are prevailing make the trade less profitable than they claim it should be, but they are, nevertheless, pleased that the position is favorable. There was very little in the manufacturers' movement to suspend on the 1st of June, and their signing of the present scale for another year has had no perceptible influence upon the market one way or another. Best Refined New Puddled is quoted at 1.9¢ @ 2¢, and Common at 1.8¢ rates. On the latter concessions are reported which range from $\frac{1}{10}$¢ to $\frac{3}{10}$¢, according to circumstances and specifications.

Norway Bars.—The market for Foreign Bar Iron continues in the same condition as heretofore. For merchant trade we quote 3.9¢, and in a jobbing way, 4¢ rates.

Structural Iron.—There is an ordinary demand for small lots, but the important orders of the season have not yet made much stir. There are a number of projected structures which have been delayed so long that doubt is expressed whether they will be erected, and the general outlook now is not so favorable as several weeks ago. Unless some decided activity in the building interest springs up very soon the season's business in Structural Iron will fall much below the expectations of a month or two ago. So far as we can learn there is no change in prices, which are as follows: From store stock ¼¢ @ ½¢ is added on these prices: Beams, $3.60; Channels, $3.60; T Iron, $3; Angle Iron, $2.50; Flitch Plates, $2.50; Frieze Plates, $2.70.

Galvanized Iron.—There has been no demand of special importance within the last week. The regular channels of consumption have been supplied in small lots, while large buyers have been making inquiries on lots for later delivery. The disposition has been to await the action of the manufacturers on the present prices. At the time of writing the matter is unsettled, but it is conceded that the discounts of the past month are satisfactory, and the following quotations will continue to be the jobbing figures: Juniata, 52½ % off; Charcoal, 55 % off, and Refined, 57½ % off.

Black Sheets.—There is considerable dissatisfaction in the Black Sheet market. The numerous qualities of Sheets in the market make it extremely difficult for manufacturers to agree upon a uniform price, as is their wont to do. For present delivery Nos. 10 to 14 are quoted at $2.60 @ $2.70; No. 24 at $3; Nos. 25 and 26 at $3.10, and No. 27 at $3.20, from store, but for delivery during July and August the price would undergo an advance of about 20¢, which is regarded as too great for the class of Iron now upon the market.

Old Car Wheels.—The market for Old Wheels is weaker and demand less pressing than a week ago. Foundries are quoting $18 @ $18.50.

Scrap Iron.—Mills are quoting $17 @ $17.50 for No. 1 Wrought, and $12 @ $13 for No. 2. Stock is plentiful and demand only ordinary. We make the following quotations as dealers' purchasing prices: No. 1 Wrought Scrap, ℔ net ton, $16.50; Cast Scrap, ℔ net ton, $13.50; No. 1 Stove Plate Scrap, ℔ net ton, $9; Wrought Turnings, ℔ ton, $9; Cast-Iron Borings, $7; Old Plow Steel, $9; Tool Steel, ℔ ton, $18; Steel Tire, ℔ net ton, $15; Buggy Springs, ℔ net ton, $17; Malleable Scrap, $5.

EVERETT & POST, 156 Lake street, Chicago, report to us as follows, under date of May 31, 1884: *Pig Lead.*—During the past week the Lead market here has been very much easier. Prices have declined slowly until to-day, the market closing at 3.45¢ @ 3.5¢ asked. Consumers still pursue the policy of buying only as their wants require. Sales during the week foot up some 600 tons of Common and Refined, for May and June delivery. The quantity of Lead offering is not large, yet enough to supply all present consumptive demands.

Chattanooga.

Office of *The Iron Age*, Carter and Ninth Sts., CHATTANOOGA, June 2, 1884.

There is nothing new to note in Southern business. The failure of the expected strike at Pittsburgh will probably prevent any serious labor complications in Southern Iron mills and Coal mines. Money is fairly easy throughout the section. Wheat harvest will in a few days engage the time and attention of families, and render the towns somewhat duller than they are. The Dayton Iron and Coal Company expect to blow in one stack in 13 months. The weather has been warm in daytime and very cool at night for the past week. Rain is needed.

Pig Iron.—There is nothing of interest in the market for crude metal. Mill Irons continue to go at $14 @ $15 in 1000-ton lots. Foundry commands $16 @ $17, near-by delivery, at furnaces. We quote small lots, 60 days: No. 1 Foundry, $18 @ $19; No. 2 Foundry, $17 @ $18; Gray Forge, $16 @ $17; White and Mottled, $14 @ $15; Car Wheel Metal, $23 @ $24.

Ores.—We quote Fossiliferous Ores, averaging about 50 % Metallic Iron, $1.75 ℔ ton, delivered at river landings; higher qualities, $2. Brown Hematite, $2 on cars at furnace.

Miscellaneous Articles.—Old Rails are nominal at $18 @ $19. Wrought Scrap, $14. Cotton-Tie Clippings, $10. Old Wheels, $18, nominal.

Nails.—The Nail market is flat at $2.35 for carloads; from store, $2.50.

Merchant Iron.—The rate for Bar weakens. Carloads go at $1.65; small lots from store, $1.75; Bolts, $2.75 @ $3 for Square and Hexagon Heads; Spikes, combination price at mills, $2.35; Splices, $1.75.

Coal.—We quote Fancy Lump at $3; Common, $2.50; run of mine to manufacturers, $1.50 @ $1.75 at mills.

Coke.—We quote at $2 @ $2.20 at furnace; Foundry Coke at 8¢ @ 10¢ ℔ bushel.

Barb Wire.—Four-Point Galvanized, 6¢ ℔ lb; Cambria Link, 6¢ ℔ lb.

Cincinnati.

June 2, 1884.—*Pig Iron.*—All conditions of the market remain unchanged from last quotations. The rolling mills in this region will not resume work till after a season for repairs and an understanding is had between the mills and workmen on a new schedule of wages. The principal stove works here have been out since the beginning of the year, and it is reported that work will never be resumed under the rule of the Molders' Union. From to-day till the resumption of work in the stove works and rolling mills, it is said that 15,000 union men will be out of employ. Some of the stove foundries are being gradually supplied with skilled laborers and apprentices outside of the union, and express confidence that work will be resumed on non-union labor within 30 or 60 days. The consumption of Iron in the rolling mills and stove foundries in Cincinnati is estimated to be about 15,000 tons per month; these establishments shut down without raw stock on hand and will draw material rapidly on resumption. The outlook of these industries is not thought to be gloomy. Quotations for the past week: Hanging Rock Charcoal Foundry, best, $22.50 @ $23; do. good, $22; do. No. 2, $21 @ $21.50; Tennessee and Alabama makes, $1.50 @ $2.50 less; do. and Virginia Coke, $18.50 @ $19; Hanging Rock Coke, $19.50 @ $20.25; do. No. 2, 50¢ @ $1 less; Best Hanging Rock, American Scotch, $20 @ $20.25; do. Silver-Gray Softeners, $19.75; good, do., $18.50 @ $19; fair, do., $17.50 @ $18; Cold-blast Charcoal Car Wheel, $28.25 @ $30; Warm-blast do., $24 @ $27; Forge, $16 @ $21, including line of Stonecoal, Coke and Charcoal makes—all four months—delivered from furnaces, less freights on above quotations to Cincinnati. Scrap Iron: Car Wheels, $20; Broken, $20.50; No. 1 Cast, 60¢ @ 70¢ ℔ 100 lb; Country, 50 @ 60¢ ℔ 100 lb; Light, 40¢ @ 50¢ ℔ 100 lb; Wrought No. 1, 78¢ @ 80¢ ℔ 100 lb; Country, 60¢ @ 75¢ ℔ 100 lb; Light, 30¢ @ 50¢ ℔ 100 lb.

St. Louis.

Hoffer & Co., Pig Iron and Iron Ore Merchants, 318 Olive street, report to us as follows, under date of May 31, 1884: The market remains about as last quoted:

HOT BLAST CHARCOAL IRONS.	
Missouri	$19.00 @ 20.00
Southern	20.00 @ 22.00
Ohio	24.00 @ 26.00
COAL AND COKE IRONS.	
Missouri	19.00 @ 20.00
Southern	18.50 @ 19.50
Ohio	21.00 @ 25.00
MILL IRONS.	
Red-short	17.00 @ 17.50
Neutral	16.00 @ 17.00
CAR WHEEL AND MALLEABLE IRONS.	
Missouri	19.00 @ 20.00
Southern	25.00 @ 28.00
Ohio	28.00 @ 32.00

Louisville.

Geo. H. Hull & Co., Commission Merchants, report to us as follows, under date of May 31, 1884: The market continues quiet, and dull in prices, but many of the foundries are doing a large amount of work, buying a fair share of Pig Iron, and sales in consequence foot up very satisfactorily. We quote for cash in round lots as below:

PIG IRON.		
Southern Coke, No. 1, Foundry	$18.50 @	$19.00
" No. 2, "	17.00 @	17.50
Hanging Rock Coke, No. 1, Foundry	19.00 @	19.50
Hanging Rock Charcoal, No. 1, Foundry	22.00 @	23.50
Southern Charcoal, No. 1, Foundry	19.00 @	21.00
Silver Gray, different grades	15.50 @	17.50
Southern Coke, No. 1 Mill, Neutral	16.00 @	16.50
" No. 2 " "	15.00 @	15.50
" No. 1 " Cold-sh't.	15.25 @	15.75
Southern Charcoal, No. 1 Mill	16.00 @	18.00
White and Mottled, different grades	14.00 @	14.50
Southern Car-Wheel, standard brands	26.00 @	27.00
Southern Car-Wheel, other brands	22.00 @	24.00
Hanging Rock, Cold-blast	27.00 @	28.00
" Warm-blast	21.00 @	23.00

W. B. Belknap & Co., Iron and Steel Merchants, Nos. 115 to 121 West Main street, Louisville, under date of May 31, report as follows: *Bars* continue dull, and no sort of price seems able to infuse any briskness into the trade. Wagon-makers are using material a little more freely, but railroads are scrimping in every conceivable way, and probably will do so until the July payment of interest is out of the way. This is enough to create a dullness of itself. Agricultural implement manufacturers are closing up their fiscal year preparatory to shutting down in summer. Crop reports, however, are encouraging, though the season is late, and by July we expect to see a slight turn in the tide. Rumors of local strikes about to occur have not thus far affected prices. At present writing it would seem likely that last year's scale will be signed by the manufacturers. *Sheet* is lifeless, except the roofing sizes, though there is some better inquiry for stove-pipe gauges, June and July delivery. *Nails* are jobbing in moderate quantities only. There is such a liberal supply that fair profit is almost out of the question. There is some talk of another shut-down, as it is a well-known fact that mills are piling up stock. Unanimity of sentiment on any given line of policy, however, seems more difficult to secure than heretofore, and it is doubtful if a general move can be organized. *Wire.*—There is a good demand for most kinds of plain Wire. A lull in fencing has checked somewhat the run on Barbed. Prices are evenly maintained, and promise to stay so. The general state of trade is about as usual for the season. It is not an unwise arrangement that the picnic and cheap-excursion season is coincident with thin orders.

Imports and Exports.

IMPORTS.

The following were the Imports of Hardware Iron, Steel and Metals into the Port of New York for the week ending June 4, 1884:

Hardware.

Aspinwall J. & Sons, Cases, 2
Baring Bros. & Co. Machinery, cs., 84
Bench & Shear, Tools, bdls., 9
Biddle C. M. & Co. Cases, 2
Boker Hermann & Co. Hdw., cutlery and guns, pkgs., 287
Curley J. & Bro. Cutlery, case, 1
Field Alfred & Co. Anvils, 138; Cases, 2
Frasse P. A. & Co. Mdse., cs., 2
Gerdan Otto, Mdse., cs., 84; Bundles, 144; Bales, 7
Godone & Mowatt, Iron tongs, 2
Hartley & Graham, Mdse., cs., 11
Markt & Co. Hdw., cs., 18
McKibben G. S. Cases, 12
Merchants' Disp. Co. Arms, cs., 32; Stamps, cs., 2
Moore's Sons J. P. Guns, cs., 18
Morris L. W. & Sons, Machinery, cs., 2
Rothschild Bros. & Co. Cases, 2
Schoverling, Daly & Gales, Cases, 17
Sellers W. B. Cutlery, cs., 3
Struller, Lau & Co. Arms, case, 1
Tice & Lynch, Filters, cs., 4
Vom Cleff & Co. Mdse., cs., 20
Wheeler A. H. Machinery, case, 1
Wiebusch, Hilger & Co. Hdw. and cutlery, pkgs., 11
Witte John G. & Bro. Cutlery, cs., 14
Order, Wire netting, rolls, 120; Iron chains, pkgs., 7; Wire netting, bdls., 117; Machinery, cs., 12; Nails, kegs, 400; Anvils, pkgs., 185; Wheels, 54; Cases, 15; Chains, cask, 1

Iron.

Baring Bros. & Co. Wire rods, coils, 843; Rods, bdls, 2712
Black Wm. Bars, 48; Bundles, 14
Brown Bros. & Co. Swedish iron, coils, 988
Cary & Moen, Rods, bdls., 178
Coddington T. B. & Co. Sheets, bdls., 277
Crocker Bros. Pig, tons, 400; Spiegel, lot, 1; Spiegel, tons, 120
Drexel, Morgan & Co. Rivet rods, coils, 670
Forwood Capt. W. Crank-shaft, 1
Lee Jas. & Co. Pig, tons, 100
Naylor & Co. Wire rods, pkgs., 123; Bars, 10,018; Pig, tons, 100; Ore, tons, 2060
Stetson Geo. W. & Co. Pig, tons, 100
Williamson Jas. & Co. Pig, tons, 100
Order, Pig, tons, 600; Wire rods, bdls., 13,331; Wire rods, pkgs., 1195; Cast iron, cs., 125; Wire, bdls., 100; Wrought beams, 110; Pipes, 36; Wire rods, coils, 622; Spiegel, tons, 200; Bdls., 1084; Bars, 2837; Rivet rods, coils, 788; Swedish iron, bdls., 1007; Coiled wire, bdls., 484; Castings, cks., 2; Wire coils, 315

Metals.

Baring Bros. & Co. Tin plates, bxs., 1554
Bache Simon & Co. Tinfoil, cs., 5
Bond, Parsons & Co. Tin plates, bxs., 165
Bruce & Cook, Tin plates, bxs., 2026; Terne plts, bxs., 635
Crooks Robert & Co. Tin plates, bxs., 127
De Lima D. A. & Co. Type, bxs., 31
Foote Emerson, Mdse., cs., 5
Page D. S. Tin plates, bxs., 577
Phelps, Dodge & Co. Tin plts, bxs., 18,675; Black taggers, bxs., 45; Tin slabs, 1087; Antimony, cks., 25
Reid John, Sinks, baths, &c., pkgs., 114
Scoville Mfg. Co. Mdse., cs., 9
Stevenson, Pierson & Co. Sheathing, cs., 125
Taylor David, Antimony, cs., 100
Tillottson L. G. & Co. Metal, cs., 7
Order, Tin plts., bxs., 22,803; Tin, slabs, 1381; Metallic capsules, cs., 25; Tin sheets, cs., 64; Black taggers, bxs., 400; Zinc sheets, cks., 130; Antimony, cks., 100

Steel.

Abbott Jere & Co. Tires, 31; Wire, bdls., 212
Brown Wm. Bdls., 70; Cases, 4
Carey & Moen, Bundles, 587; Casks, 16
Cooper, Hewitt & Co. Bess. rods, bdls., 488
Great Western Disp. Co. Beams, 8
Hammel L. & Co. Steel chains, case, 1
Morton, Bliss & Co. Sheets, cs., 25
Naylor & Co. Flat rods, 3649; Billets, pcs., 129
Power W. C. Casks, 20; Bundles, 79
Wagner W. F. Bundles, 215; Bars, 92; Cases, 4
Order, Rails, tons, 350; Rails, 2388; Car wheel tires, cks., 69; Wire rods, coils, 4544; Bundles, 210; Bars, 143; Forgings, 16; Cases, 30; Casks, 9; Strips, cks., 47; Old leaf spring, tons, 66; Blooms, 112; Rail ends, tons, 85; Spiegel, tons, 210

The imports of metals and hardware for the week ending May 30 were as follows:

	Quantity.	Value.
Aluminium	1	881
Antimony	40	2,423
Brass goods	60	8,574
Bronzes	19	2,210
Chains and anchors	41	1,872
Clocks	58	7,794
Cutlery	84	23,791
Guns	183	22,385
Hardware	19	735
Iron, pig, tons	5,110	111,838
Iron, sheet, tons	66	4,995
Iron tubes	24	233
Iron, other, tons	1,061	50,070
Machinery	887	16,538
Metal goods	381	36,599
Nails	108	335
Needles	27	6,790
Nickel	9	4,974
Old metal	...	5,113
Platina	3	6,395
Plated ware	10	1,566
Percussion caps	56	5,143
Pins	8	829
Plumbago	692	4,260
Quicksilver	2	84
Saddlery	19	2,760
Steel	36,666	60,313
Tin, boxes	52,018	208,269
Tin, 3,232 slabs	273,523	51,399
Wire	663	9,129
Zinc	22,046	892
Zinc oxide	400	3,388

The comparison with previous weeks is as follows:

	For the week.	21 weeks of 1884.	Same time 1883.
Cutlery, pkgs	84	2,118	3,072
Hardware, pkgs	19	341	635
Iron, R. R., bars	....	9,422	6,324
Lead, pigs	....	18,153	3,847
Steel, pkgs	36,666	613,287	629,452
Tin, bxs	52,018	809,739	774,534
Tin slabs, lbs	273,523	7,420,772	9,236,872

EXPORTS.

The following were the Exports of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending June 3, 1884:

	Quan.	Val.
Danish West Indies		
Ptlm., gals	1250	$167
Springs, box	1	25
Iron, bdls	25	70
Hdw., cs	3	60
Mach'y, pkge	1	465
Christiania		
Hdw., cs	2	25
Ag. imp., pkgs	2	365
Pumps, hhds	2	93
Bremen.		
Clocks, pkgs	7	170
Ag.imp., pkgs	101	1,783
Hdw., cs	2	27
Sew. ma., cs	55	1,500
Rifles, cs	2	49
Mf. iron, pkgs	20	400
Ptlm., gals	423,686	36,000
Elsinore.		
Ptlm, gals	82,707	6,823
Hamburg.		
Mach'y, pkgs	49	3,536
Hdw., pkgs	164	4,783
Old met., pkgs	158	5,200
Ptlm., gals	226,558	18,679
Pumps, pkge	1	25
Organs	16	1,470
Ag. imp., pkgs	171	2,189
Shears, bxs	9	97
Cutlery, case	1	135
Clocks, pkgs	27	804
Sew. mach. cs	1314	20,180
Tin tags, bdls	6	177
Mf. iron, pkgs	2	97
Copenhagen.		
Mf. iron, pkgs	10	315
Ag.imp., pkgs	8	305
Clocks, pkgs	88	955
Hdw., cs	9	255
Dutch West Indies.		
Ptlm., gals	2479	365
Sew. ma., cs	2	42
Nails, cs	2	33
Hdw., pkgs	10	185
Pumps, pkgs	6	50
Cutlery, cs	8	90
Dutch East Indies.		
Ptm., gal	1,385,250	149,120
Rotterdam.		
Hdw., pkgs	9	180
Ag. imp., pkgs	2	168
Sew ma., cs	305	6,974
Mach'y, pkgs	4	330
Pumps, pkgs	12	695
Tuborg.		
Ptlm., gals	245,999	20,900
Liverpool.		
Copper matte, sks	942	24,075
Sew. ma., cse	1	30
Ox. zinc, bbls	50	360
Anvils, pkgs	3	110
Copper, bars	649	14,617
Cot. gins, cs	2	110
Mf. iron, pkgs	10	150
Nails, case	1	50
Ag. imp., pkgs	418	8,878
Clocks, pkgs	162	4,700
Hdw., cs	26	1,034
Mach'y, pkgs	17	4,428
Guns, case	1	55
Br'ss cups, cks	85	8,691
Weld'g comp., case	1	25
Cutlery, case	1	65
Copper ore, sacks	20,499	114,110
Antwerp.		
Pumps, pkge	1	29
Amsterdam.		
Hdw., cs	5	52
Clocks, cs	2	25
Plymouth.		
Ptlm. gals	257,269	23,500
Exmouth.		
Ptlm., gals	137,862	12,748
Hull.		
Ag. imp., pkgs	8	660
Bristol.		
Clocks, cs	38	533
Hdw. case	1	150
Gibraltar.		
Ptlm., gals	55,000	5,500
London.		
Sew. ma., cs	246	5,089
Ptlm., gals	19,060	2,948
Tin waste, bbls	50	112
Mach'y, pkgs	184	7,094
Ox. zinc, bbls	100	840
Empty shells, cs	431	8,640
Guns, cs	159	35,015
Scabbards, cs	2	600
Clocks, pkgs	86	6,685
Hdw., cs	46	5,687
W. wheel	1	250
Locomotive	1	6,616
Per. caps, cs	3	600
Bayonets, cs	9	1,620
Ag. imp., pkgs	24	551
Glasgow.		
Ag. imp., pkgs	96	2,505
Ptg. mach, pgs	1	135
Mach'y, pkgs	12	1,300
Hdw., cs	36	362
Needles, case	1	1,496
Clocks, pkgs	17	969
Cutlery, case	1	316
S. pumps, pgs	9	5,671
Sew. ma., cs	132	6,057
Blowers, cs	3	204
Ag. imp., pkgs	25	1,069
Mf. iron, pkgs	20	385
Nova Scotia.		
Clocks, cs	5	70
Mf. iron, pkge	1	9
Hdw., cs	5	122
British East Indies.		
Ptlm., gals	735,000	73,250
New Zealand.		
Ag. imp., pkgs	173	6,556
Nails, cs	43	969
Wringers, cs	4	80
Tacks, case	1	13
Pumps, pkgs	12	650
Cutlery, cs	3	70
Hdw., pkgs	179	3,485
Ptlm., gals	58,560	7,751
Mf. iron, pkgs	94	869
Clocks, pkgs	2	83
W. mills, cs	4	50
British Possessions in Africa.		
Hdw., pkgs	80	1,092
Nails, kegs	50	175
Scales, cs	11	155
Ptlm., gals	23,600	3,248
Mf. iron, pkgs	22	185
Sew. ma., cs	4	140
Ag. imp., pkgs	191	6,061
Clocks, pkgs	16	350
British West Indies.		
Mf. iron, pkgs	28	237
Ag.imp., pkgs	2	28
M. dust, bbls	5	10
Saws, bxs	2	40
Hdw., pkgs	37	761
Ptlm, gals	16,585	1,765
Nails, kegs	64	240
Clocks, cs	5	128
Sew. ma., cs	2	35
Iron, pkgs	50	579
British Guiana.		
Clocks, case	1	19
Hdw., pkgs	4	116
Newfoundland.		
Iron, bars	5	59

	Quan.	Val.
Mf. iron, pkgs	14	97
Mach'y, pkgs	2	473
Hdw., case	1	25
Havre.		
Ag. imp., pkgs	71	6,130
Cop. carboys, cs	16	1,200
Copper, cks	58	15,800
Cette.		
Ptlm., gals	422,065	30,458
Rouen.		
Ptlm., gals	401,550	32,125
Dunkirk.		
Ptlm., gals	308,663	23,670
Cuba.		
Hdw., pkgs	73	1,215
Cutlery, cs	29	602
Bells, bxs	2	50
Scales, cs	4	82
Nails, kegs	284	633
Pumps, pkgs	6	114
Tacks, cs	2	35
Nails, cs	19	187
Mach'y, pkgs	129	7,282
Tin, cs	4	38
Saws, cs	3	70
Mf. iron, pkgs	470	2,635
Cartridges, cs	2	42
Ptlm., gals	104,396	9,512
M. dust, bbls	10	13
Clocks, pkgs	6	55
Sew. ma., cs	2	16
Ag. imp., pkgs	12	277
Loco. mat. cs	3	502
Porto Rico.		
Ptlm., gals	12,760	1,397
Mf. iron, pkgs	50	260
Hdw., case	1	63
Nails, kegs	60	137
French West Indies.		
Ptlm., gals	3000	300
Clocks, pkgs	4	52
Hdw., cs	16	329
Central America.		
Ptlm., gals	2468	346
Cutlery, pkgs	13	75
Sugar mills	3	168
Shot, sks	30	43
Mf. iron, pkgs	42	198
Nails, kegs	17	68
Hdw., cs	21	210
Ag. imp., pkge	1	8
Brazil.		
Mf. iron, pkgs	78	651
Ag. imp., pkgs	9	60
Tacks, bxs	40	280
Ptlm., gals	51,600	5,720
Cutlery, cs	11	345
Hdw., pkgs	247	1,930
Irons, cs	100	500
Clocks, pkgs	12	255
Scales, cs	5	40
Cotton gins, cs	10	500
Pumps, pkgs	2	160
Hayti.		
Hdw., cs	12	167
Sew. ma., cs	21	825
Ptlm., gals	450	78
Condenser coil	1	35
Mach'y, pkgs	2	36
Japan.		
Hdw., pkgs	150	875
Scales, cs	12	180
Ptlm., gals	357,250	36,647
Mf. iron, pkgs	54	592
Clocks, pkgs	20	451
Scales, cs	12	245
Genoa.		
Hdw., cs	3	105
Mexico.		
Bells, case	1	34
Clocks, cs	2	95
Ag. imp., pkgs	20	84
Machy., pkgs	24	1,508
Sew. ma., cs	86	1,719
Nails, kegs	87	261
Cartridges, cse	1	35
Shot, kegs	50	287
Tin, cs	30	190
Wh'ls on ax.pr	16	84
Hdw., cs	75	1,391
Wire, goods cs	2	22
Cutlery, cs	60	1,935
Ptlm., gals	15,500	1,974
Mf. iron, pkgs	261	1,405
Tacks, cs	7	70
Pumps, pkgs	2	14
Iron, sheets	96	1,143
Lisbon.		
Hdw., cs	24	600
Clocks, cs	80	1,369
Cartridges, cs	2	105
Mf. iron, pkgs	6	66
Arms, cs	6	1,028
Wire mill	1	40
Cadiz.		
Ag. imp., pkgs	11	181
Bilbao.		
Ptlm., gals	110,200	10,630
Santo Domingo.		
Ptlm., gals	3320	598
Nails, kegs	49	248
Sew. ma., cse	1	21
Mach'y, pkgs	5	171
Scales, case	1	20
Iron, bdls	112	238
Hdw., cs	6	121
Mf. iron, pkgs	4	186
I. tubes	78	331
Venezuela		
Hdw., pkgs	253	2,518
Sew. mch., cs	55	961
Pumps, pkgs	6	156
Cutlery, cs	45	810
Clocks, cs	5	172
Ag. imp., pkgs	10	146
Iron, tank	1	107
Nails, kegs	69	200
Saws, case	1	62
Buckles, cse	1	24
Mach'y, pkgs	37	1,124
Tacks, cs	31	247
Mf. iron, pkgs	195	1,624
Scales, cs	8	137
Ptlm., gals	16,450	1,899
United States of Colombia.		
Ptlm., gals	3344	545
Mf. iron, pkgs	339	1,735
Hdw., pkgs	174	3,482
Nails, bxs	7	50
Clocks, cs	19	385
Nails, kegs	8	25
Cartridges, cs	10	257
Pumps, pkgs	3	60
Ch'ns & a., pgs	7	98
Sew. ma., cs	255	8,090
Mach'y, pkgs	271	7,424
Cutlery, cs	18	595
Ag. imp., pkgs	17	880
Scales, cs	8	211
Saws, cs	3	40
Iron safes	3	175
Revolvers, cs	6	692
Iron, bdls	50	200
Rifles, case	1	25
Still	1	820
Needles, case	1	21
Brass gds., cse	1	90
S. w. fount's	2	190
Argentine Republic.		
Sew. ma., cs	90	1,504
Cutlery, cs	23	841
Scales, cs	31	463
Brake sh's, cks	24	620
Ag. imp., pkgs	111	3,910
Hdw., pkgs	83	1,890
Ptlm., gals	158,000	17,910
Needles, case	1	146
H. shoe n'ls, bs	780	3,010
Mach'y, pkge	1	87

Coal.

The Anthracite Coal trade is dull, affording no pretext whatever for an advance of 25¢ ℔ per ton in July, as talked of in some quarters. In accordance with the programme for the present month, this week is an idle one at the mines, but it is evident that half-time does not diminish production in like proportion. So far as now appears the receivership for Reading will not affect the relations of that corporation to the Coal trade. Last week Reading shipped 305,000 tons. The total amount of Anthracite Coal sent to market for the week ending May 24 was 498,603 tons, compared with 470,238 tons in the corresponding week last year. The total for the year is 9,987,750 tons, compared with 10,579,433 tons for the same period last year. Shipments of Bituminous for the week, 125,000 tons, and for the year 2,057,000 tons, compared with 1,883,000 tons for the same time last year.

Foreign Markets.

FRANCE.

Paris, May 18, 1884.—*Metals.*—Although the general situation in France, both financial and commercial, has been fast improving of late in consequence of the ability and success of the men at the helm of affairs, the Metal and Iron branches find it difficult to gain a footing of greater prosperity. Metals have been only moderately active, and all lower, with the exception of Spelter, which has remained steady. We quote, in francs, ℔ 100 kg.: *Copper.*—Chili Bars, 147.50 @ 151.25; Ingots and Slabs, 156.75; Best Selected, 161.25, and Pure Corocoro Ore, 153.75; *Tin*, Banca, 242.50; Billiton, 235; Straits, 230; Australian, 231.25, and English, 228.75; *Lead*, 27.25 @ 28.50, and *Spelter*, 38.50 @ 39. *Iron.*—There has been no improvement in the Iron trade. As for public works, they are planned and promised, but nothing appears of them yet, and as for work for the great railways, nothing transpires in railway material for them except a few orders given to the Loire works. There is no change here; the Northern Department continues to deliver Merchant at 15.50 @ 16 at La Chapelle, with a reduction of 50 centimes on larger lots. We quote Charcoal Iron here 24; Sheets, 21 @ 25, and Wire Nails, in bulk, No. 18, 27 francs ℔ 100 kg. At the North there is a slight revival in the demand, but none for Rails. Prices are unsatisfactory. In the Ardennes the Nail works are the only concerns in receipt of large orders. The Haute-Marne is dull. At the Centre, at St. Etienne, the situation remains precarious in the extreme. As all crops in France, however, promise tolerably well, it is to be presumed that, with the better feeling in business we have alluded to, we shall soon see a general improvement in trade, and that Iron, Steel and Metals will be benefited thereby. *Coal* remains moderately active only and tolerably sustained.—*Moniteur des Interets Materiels.*

BELGIUM.

Brussels, May 19, 1884.—*Iron.*—At Charleroi there is no improvement in the Iron situation noticeable; in spite of the readiness to make concessions, orders do not increase, the only export order received during the week being 4000 tons Merchant Iron for China. Some pressure is made to play in Government circles to induce the State to order Locomotives for its lines, of which it stands in need of some 300, and the Iron Sleepers it wants, frequently referred to. From Liége we are told that Cockerill has received orders for field-pieces from Morocco. The fact is, that while the big concerns are still tolerably well provided with orders, the smaller Iron works complain of a lack of them, and in this manner the general situation leaves much to be wished for. Prices are so low that they cannot well decline any further, and should be an inducement to cause consumers to come forward and buy. As the general outlook in business in Europe is, however, encouraging, and as both in Germany and Austria quite a revival in the Iron trade as set in, it is fair to presume that we, too, are on the eve of better times. Prices have, on the whole, been steady. We quote English Pig 5.45 francs ℔ 100 kg.; Charleroi, 6.75, and Luxembourg, 5.30; Puddling, 4.10 @ 5.10. The better qualities of Merchant command between 11.50 and 13; Sheets, 16 @ 26. The fiftieth anniversary of the introduction of railroads is to be celebrated in this city with great magnificence. Belgium produced last year 770,000 tons of Pig Iron, against 727,000 in 1882; 478,000 of Finished, against 500,000, and 153,000 tons of Steel, against 151,000. *Coal.*—We produced 18,135,000 tons, against 17,591,000. Coal has become dull, but prices have been sustained nevertheless; the demand is pretty much limited to common industrial for the moment.—*Moniteur Industriel.*

GERMANY.

Hamburg, May 19, 1884.—*Iron.*—There continues to be a feeling of great confidence in the Iron trade in Germany. From Upper Silesia a better business is reported in the Pig Iron trade, with good prospects for export. The weekly production now exceeds 8500 tons. The bulk of blast furnaces—some 28—have now, between the filling of former orders and the demand from rolling mills, got rid of nearly their entire accumulated output. The remaining blast furnaces cannot say as much. They quote 51 @ 52 marks. Old Cast Iron Scrap sells at 50. The foundries are very busy, especially in turning out heavy pieces for mines, &c. Boiler-makers are very busy, too; several have received commands to last them for months to come. Quite a revival has set in in rolling-mill products; also for export. The demand for Merchant Iron has increased materially the last few weeks. The greatest activity prevails in Rod Iron, and promises to last some time. Sheets are in demand for export, too. They quote Merchant, 115 @ 150; Sheets, 160 @ 180; for future delivery an advance is asked. In Rhenish Westphalia the dealings in Finished Iron are quite lively. Pig Iron is less so, the demand up to July 1 being satisfied. In Rod Iron the demand, though fair, has not quite come up to expectations; hence the price has not been enhanced. Structural has risen, being in demand; Sheets have moved off steadily without change. The Wire rolling mills are actively engaged in filling export orders, but prices have been left unaltered. Steel works have been getting on tolerably well, although orders for railroad material might be larger in the aggregate. Machinists and foundries are quite busy; locomotive and car works are satisfactorily occupied still, but fresh orders have begun to flag. *Metals.*—Lead has been quiet and weak at 11.75 @ 12 marks; Copper higher, closing steady at 68 @ 70 for Lake Superior; Tin firm at 98 @ 99, and Spelter quiet and lower at 14.50 @ 15.20, all in marks, ℔ 100 lb.—*Borsenhalle.*

HOLLAND.

Rotterdam, May 17, 1884.—*Tin.*—The market has been unfavorably influenced by heavy shipments from the Straits and the financial panic in New York. However, it closes firm after a drop of ⅛ guilder; Banca, spot, and next sale, at 54; Billiton, spot, 52; August, 52.50. At Amsterdam Banca is worth 54.25; Billiton, 51.50, both spot, and the latter, August, 52.—*Koch & Vlierboom.*

CHILI.

Valparaiso, March 31, 1884.—*Copper.*—Private telegrams from Liverpool announce a decline in Copper to £54, but the lower exchange has revived the demand, so that the price is higher now than it was a week ago. Sales, 42,000 quintals, from $16.20 to $17.60, the latter being equal to £53. *Nitrate.*—The Iquique Syndicate has maintained the price of $2.22½, but outsiders sold at $2.20; nevertheless, even this low figure does not elicit much of a demand. The article is now ruled by the exchange more than anything else. Sales, 312,000 quintals, at between $2.25 and $2.17½, equal to 8/3. Fortnight charters, 19,700 tons for Europe, and 3800 for the United States. *Coal* is scarce, and has been paid as high as 40/ at Iquique from second hands. Visible supply reduced and price high, say 34/6 @ 35/, to arrive. *Exchange*, 90 days, declined from 31⅞d. to 31d.—*Weber & Co.*

EAST INDIES.

Manila, April, 4, 1884.—*Iron.*—The demand for Galvanized Roofing Iron continues quiet, and small lots of Walker's Best Three Crowns have been placed at $5, while other brands are difficult to sell at $4.50 @ $4.62½ ℔ quintal. No. 1 Govan Pig Iron is quoted $1.50 @ $1.56¼, and Govan Bar Iron at $3.75 @ $3.87½ ℔ picul. *Petroleum.*—The demand for Petroleum is quiet, and small lots have been placed at $2.25 @ $2.31¼ ℔ case. *Coal.*—Australian has been sold at $8 ℔ ton for comparatively distant to $7.75 ℔ ton for arrival in a month, cash, ex ship, bill of lading weight. *Cardiff Coal* may still be quoted $9.50, same terms. *Exchange*, 3/9, four months' sight drafts on London.—*Kustermann & Co.*

Singapore, April 14, 1884.—*Tin.*—The sales here have been very small, dealers refusing to meet the demand at current prices, but, in sympathy with London, the market has slowly hardened, closing value being $26.50. In Penang there has been a fair business done for India and China. Supplies have not come forward so freely as was expected, owing to some unexplained cause, but a good deal of Tin is held on the spot. So far as can be seen at present the month's exports will be upward of 1500 tons. *Tonnage* is in sufficient supply to meet all demands. For New York the Hero will clear in a day or two, and the Helene has begun loading. The P. J. Carleton is coming here from Penang to fill up. For Boston no further business is reported. Exchange is steadier at 3/8⅝ for six months' credit drafts on London. Shipments from the Straits' Settlements to the United States during the first quarter have been 15,724 piculs, against 26,685 in 1883, 33,252 in 1882, 9875 in 1881, 53,411 in 1880 and 35,322 in 1879. On April 7 the Clyde took for New York 840 piculs.—*Gilfillan, Wood & Co.*

Iron Production in the South.

Following are some points of interest that came under our Chattanooga representative's notice while on a visit to Birmingham, Ala., last week: Eureka furnaces are in full blast. The company are sold ahead about six months. Woodward Furnace is blowing full, with a fair show of orders. Alice Nos. 1 and 2 are in full blast, making about 140 tons per day, chiefly forge irons. The company have 1500 tons on the bank and 6000 tons contracted for. Orders at present prices are declined. The contracts and orders booked will keep the furnaces at work for six months. What foundry is put out commands about $16.50 per ton at furnaces, cash. Sloss furnaces have been fully overhauled. One stack is in and one ready to blow in as soon as the market will justify. No. 2 will not be lit up until more favorable markets appear. The make is about 106 tons daily. The overhauling was done by Mr. A. Evans, Jr., blast furnace expert, of Birmingham, and is a very excellent piece of work. The company have 200 tons in the yard and orders for 6000 tons ahead, and are out of the market for the present. They make forge iron. The Mary Pratt Furnace is in first-class condition, but out of blast on account of the market. The company are in no hurry to go in. They could not now secure orders without cutting under the present low rates, and there is little money in the business at its best. Edwards Furnace is out for the same reason. The time this plant will be put in depends entirely on the trade. Three new stacks are projected in the Birmingham district and will be built within the next two years.

The Linn Iron and Machine Works are running about two-thirds full, mostly on hoisting and mine machinery. This company made the engines, four in number, of the Sloss furnaces, and better blowing machinery is not to be found in the country. The company are very fully equipped for the making of heavy enginery, and their products are very creditable to the management. Birmingham Foundry is making about 10 tons of finished material per day, mostly cast pipe. The company have projected an extension that will increase the capacity to 70 tons daily. The manager has declined orders for 750 tons in May on account of lack of facilities to fill them. The rapid advancement of Southern towns into cities, demanding water works and gas works, keeps the cast-pipe trade lively. These works pay about $15 per ton for the pig iron used. The Birmingham Rolling Mill, one of the most complete plants of the kind in the country, is running full. The product is bar, fish plate, angle iron, light rail, sheet and plate irons. The daily output is 45 tons. The management will not sign the scale as demanded by the union men employed. They have plenty of non-union men to run the works, and will not stop, no matter what the union men may do or try to do.

The combination of De Bardeleben and the Phillips Beettorff Company, of Nashville, will build a blast furnace and stone mantel and grate foundry near Birmingham. The capital will be $250,000, half furnished by each party. The capacity of the foundry will be about 40 or 50 tons daily, half at Birmingham, half at Nashville. The iron will be charged to the foundry at $12.50 per ton, about what the combination expect will be the net cost of producing it. This is the whole story of the great "sale" of foundry iron at this low rate—only this and nothing more.

The position of the Southern railroads in the present emergency of low prices and dull trade is most commendable. Some of the lines in the Southern pool are now hauling pig iron at 56 mills per ton per mile, at which they are, of course, losing money. The managers make no distinction between furnaces located on single lines or at the termini of several. These are better rates than Northern lines generally give, and they enable Southern stocks to keep going.

The general outlook for iron production in the section, as to quality, is better than the immediate prospect of prices. The coke stacks of Tennessee and Alabama within the next 18 months will have a capacity of fully 500,000 tons annually. La Grange Furnace, on Tennessee River, in West Tennessee, has been fully rebuilt and will blow in on the 15th inst. The plant has a very high reputation for fine foundry irons, and in its renewed condition will make about 45 to 50 tons of hot-blast charcoal pig of the best brand. The stack will be blown by two new engines fitted with two batteries of boilers and Allimer charger.

Many points not at all developed in the South are quite as favorably located for making iron cheaply as Chattanooga or Birmingham. The advantage these cities enjoy is in the fact that their districts have passed the experimental stage. It costs great sums of money to build up a trade center, test raw material and get rid of incompetent management. Alabama iron works have only failed when they have fallen into the hands of enthusiastic amateurs. The practical men in that section repudiate all estimates of the cost of iron production below $12.50 per ton, though some of them have been slow to contradict stories of phenomenal cheap production, regarding them as valuable advertisements to attract investors.

Trade Report.

General Hardware.

The result of our observations regarding the general trade during the past week is much the same as that indicated in our report a week ago. The demand has still further fallen off, but orders continue frequent, and indicate light stocks in the hands of jobbers and retailers. Prices show but little change, manufacturers in most lines being prevented from advancing their goods by the existing competition and quiet condition of trade, although prices are in most instances acknowledged to be too low. The fact that stocks throughout the country are light is a satisfactory feature of the situation, and manufacturers will be wise in neither accumulating too many goods nor attempting to market their production by giving inducements in the way of special discounts.

There is a good deal of complaint on the part of manufacturers that jobbers break their prices, and demoralize the market by giving to the general trade the special discounts which they receive as large purchasers. A prominent house, whose goods are very widely known, wrote us some time ago that they had previously allowed a rebate from their regular price to jobbers, who entered into a formal agreement to maintain their prices; but they added that because more than one-half of all those who had signed the agreement did not keep it they were compelled in self-defense to cut off the rebate. They allude to this as a sad commentary upon the lack of integrity in the trade. It certainly is an unwise policy which in the long run must react against the jobbers. Manufacturers, for the maintenance of their prices and protection of the great body of their trade, will be obliged to adopt such a course as will prevent a continuance of the practice. Hardware merchants are aware of the large number of important lines of which leaders have recently been made, much to the injury of regular trade; and the present tendency seems to be toward an increase rather than a diminution of the evil.

BARB WIRE.

The principal occurrence of interest in the Barb Wire trade during the past week has been the meeting of manufacturers at Chicago. Last Thursday the meeting took place, and it was largely attended by representatives of factories in all parts of the country. James Larman, president of the Cincinnati Barb Wire Company, was chairman, and J. W. Gates, president of the Southern Barb Wire Company, secretary. After a lengthy discussion it was resolved to close all manufactories from July 1 to September 1, and longer if necessary, in order to curtail the supply. It was reported at the meeting that the demand for Wire had been very heavy up to some two weeks ago, but that orders had now fallen off considerably, though in most localities the factories still have back orders to be filled, the principal exception to this order of things being St. Louis, at which point stocks were accumulating. Much depends upon the disposition of manufacturers to agree to carry out the resolution for a two months' stoppage. So far all the factories heard from are in favor of shutting down. It is expected that by this time next week all the factories will have been heard from and the result announced. If the stoppage is accomplished, prices will be maintained. If not, prices will naturally go lower. A weakening tendency has been developing recently, but it has not become sufficiently pronounced yet to influence quotations, which continue as follows: Car lots, Four-point, Painted, 5 cents per pound; car lots, Two-point, Painted, 5⅛ cents per pound. Thick-Set Wire, ⅛ cent extra. Galvanized Wire, 1 cent per pound advance over Painted. Broken car lots, ¼ cent per pound above car lots. Free on board, Chicago, St. Louis, Pittsburgh and New York. Terms: 60 days, or 2 per cent. off, cash 10 days.

NAILS.

Although some dealers report their trade very satisfactory, the demand generally is much lighter than it has been. This is particularly true of the dealers who have been supplying the New England trade in addition to their own regular customers. New England Nails are now in good supply here, and their presence is felt, inasmuch as there has been no increased demand in other directions to compensate for the addition thus made to local stocks. As the end of the season is approaching, and the usual summer dullness will soon be here, it is quite natural to expect this condition of affairs and to look for some shrinkage in prices. Quite unexpectedly, however, the Western factories have come to an agreement with their men on the wages question, continuing the old scale, with 20 per cent. extra for cutting Steel Nails when harder than Iron, and this causes buyers to anticipate still lower figures. Some Eastern Nail factories will, however, take a much longer summer vacation than usual, and there is a chance that production may be restricted in the West, so that sellers are not without hope of being able to maintain prices somewhere near their present figures. Within the past week there have been inquiries in this market from the West for three-penny fine Nails, and some sales have been made, indicating a short supply of small sizes in that section. Prices are quoted at $2.60 for small lots, and $2.45 @ $2.50 for large lots, with $2 40 as a bottom rate for the most desirable orders.

CAST BUTTS.

The manufacturers of Cast Butts, dissatisfied with the unremunerative prices which have of late prevailed, owing to the animated competition and the consequent break in prices, held a meeting in this city on the 29th ult., at which nearly all the principal makers were represented either in person or by letter. The situation was thoroughly canvassed, and it was decided to return to the prices on Butts which were made in September last. As a result of this action there is an advance in Butts from figures recently prevailing to the following prices:

	Dis. per cent.
Cast Narrow Fast Joint Butts, Drilled and Wire Jointed	40&10&10
Cast Broad Fast Joint Butts, Drilled and Wire Jointed	40&10&10
Cast Narrow Loose Joint Butts, Drilled and Wire Jointed	60&10
Cast Broad Loose Joint Butts, Drilled and Wire Jointed	60&10
Cast Parliament Butts, Drilled and Wire Jointed	60&10
Cast Mayer's Hinges, Drilled and Wire Jointed	60&10
Japanned Loose Joint Butts, without Acorns	60&10
Japanned Loose Joint Butts, with Japanned Tips	60&10
Japanned Loose Joint Butts, with Silvered Tips	60&10
Japanned Fast Joint Butts, without Acorns	40&10&10
Japanned Fast Joint Butts, with Japanned Tips	40&10&10
Japanned Fast Joint Butts, with Silvered Tips	40&10&10
Japanned Fast Joint Butts, Narrow	40&10&10
Figured Loose Pin Butts, with Tips	60&10
Figured Loose Pin Butts, with Japanned Tips	60&10
Figured Loose Pin Butts, with Silvered Tips	60&10
Figured Loose Pin Butts, without Acorns	60&10
Japanned Parliament Butts, without Acorns	60&10
Japanned Parliament Butts, with Japanned Acorns	60&10
Japanned Parliament Butts, with Silvered Acorns	60&10

LAWN MOWERS.

The market on these goods is somewhat disturbed by reports that sales are made below the combination rates, but most of the manufacturers are fully occupied with orders, and claim that there is no reason for their making a change in quotations at this time. Some of the best known and most approved machines are held with firmness, and the manufacturers announce that there is no departure from established prices.

TINWARE.

Only a light business is doing in Stamped Ware, as usual at this season. The manufacturers, however, report a fair demand for summer specialties in Japanned Ware. There has been no recent change of importance in prices, margins on most lines of staple goods being very narrow. There is still, especially in Stamped Ware, an unpleasantly animated competition, as a result of which the quality of the goods is sometimes sacrificed. There are no definite indications of an agreement among manufacturers as to existing differences, but it is vaguely intimated that something may be accomplished in that direction before long.

There has been considerable delay in putting on the market a sufficient supply of the

RUSTLESS HOLLOW-WARE

which is made by the Bower-Barff process by William T. Wells, whose office and warehouse are at 7 and 9 Cliff street, New York, the works being at Little Ferry, N. J. The arrangements for the production of this line are, however, now complete, and Mr. Wells is prepared to meet the demands of the trade for these goods. In alluding to the advantages which this ware possesses, the manufacturer, in his price list, refers to Enameled Ware as expensive and not durable, the coating soon flaking off and leaving an iron surface exposed; to Tinned Ware as also expensive, the coating soon melting off and leaving the surface exposed to rust; to Galvanized Ware as not wholesome, the oxide of zinc which forms on it being a rank poison, and the coating not being permanent. Rustless Hollow-ware is claimed to be superior to these for the following reasons: That it is almost as cheap as common Iron Hollow-ware; that it is absolutely free from poison; that it will not easily flake or chip off; that heat will not melt it or crack it; that if by any chance any part of the coating is removed from the iron, and the spot rust, the rust will be strictly local; that it will not spread sideways, as it would on Galvanized or Enameled Ware; that it is as clean as Glazed Earthen Ware, and is rustless. The Rustless Ware is sold from the Hollow-ware list at a discount of 50 and 5 per cent.

MISCELLANEOUS PRICES.

The following is the price list of the Buckeye Hose Reel and Sprinkler, made by Mast, Foos & Co., Springfield, Ohio, a description of which we give on page 37. The appended list gives, it will be seen, a description of the different numbers, and is subject to a discount to the trade of 25 per cent:

No. 1, Plain Hose Reel, Medium Size, carrying 100 feet ¾-inch Hose	each, $4.00
No. 2, Hose Reel and Lawn Sprinkler combined, carrying 100 feet ¾-inch Hose	each, $6.00
No. 3, Plain Hose Reel, Large Size, for carrying 200 feet ¾-inch Hose	each, $5.00
No. 4, Hose Reel and Lawn Sprinkler, combined, carrying 200 feet ¾-inch Hose	each, $7.00
Nickel or Silver Plated Sprinkler Tops, $1.50 extra.	

The Waverly Apple Parer, made by L. A. Sayre, 28 Orange street, Newark, N. J., of which we give a description on page 37, is sold at $5 per dozen, subject to a discount of 10 per cent.

The Jersey Apple Parer, Corer and Slicer, described on the same page, is sold at $7.50 per dozen, discount 25 per cent.

The Automatic Fruit Pail, also illustrated among "Hardware Novelties," is sold at $18 per dozen, with a discount to the trade of 20 per cent.

The following is the price list of the Davis Standard Rowlocks, of which Frank E. Davis, Gloucester, Mass., is patentee and sole manufacturer. His catalogue gives a full description of the special features of this article:

In Galvanized Malleable Iron.

	Width opening between horns.	Suitable for an oar from	Price per doz. p'rs.
No. 1	1¾ inches.	8 to 10 feet.	$10.50
No. 2	2 "	10 to 12 "	12.00
No. 3	2¼ "	12 to 14 "	15.00
No. 4	2½ "	14 to 16 "	18.00

Discount 33⅓ per cent. and 5 per cent. for cash.

In Brass.

	Plain Brass Dipped. Per pair.	Polished Brass. Per pair.
No. 1, capacity as above	$1.75	$2.75
No. 2, " "	2.00	3.00
No. 3, " "	2.50	3.50
No. 4, " "	2.75	4.00

Discount 20 per cent. and 5 per cent. for cash.

These goods are also for sale by W. & J. Tiebout, 16 Chambers street, New York.

On page 45 the Medina Manufacturing Company, Medina, N. Y., advertise the Hamilton Patent Wrought-Iron Barn Door Hanger, which they are selling from the following list at a discount of 50 per cent.:

4 inch, per pair	$1.00	6 inch, per pair	$1.50
5 inch, "	1.25		

They call attention to a novel feature in this Hanger, as the wheel has a double tread and a center flange running upon and between a double wood track, the track being opened in such a manner as to allow all dirt to drop through.

The following are the prices of the Patent Eave-Trough Fasteners made by J. P. Abbott, Cleveland, Ohio:

Universal, including Nails and Clasps.

Galvanized, per gross	$5.50
Machine for Bending	0.50
Pincers	0.20

Discount on above, 20 per cent.

Triumph, including Cross-Bars, Tinned, and Clasps.

No. 1, 3¼-inch Inside Bead, Half Sheet, ₱ gr.	$6.00
No. 2, 5-inch " " Whole " "	7.50

Discount, 30 per cent.

During the past year the Triumph has been improved by the addition of a Patent Perforated Rivet, so that the strap can be fastened by using a small Nail. The manufacturer claims that in this way fully one-third the time is saved in putting on, as one man can put the cross-bars on the trough while another bends the straps. By this arrangement, also, the trough can be taken down if desired without disturbing the straps on the roof. While this Rivet is regarded as a great improvement, it can be riveted if preferred the same as an ordinary Rivet.

Bostwick & Burgess, Norwalk, Huron County, Ohio, for whom John H. Graham & Co., 113 Chambers street, are agents, are known to the trade as manufacturers of the Queen Carpet Sweeper, to which a recent improvement has been added in the form of a Rubber Furniture Protector, a band of rubber running along the front and around the corners serving this purpose. They have also just completed and are about to put on the market the King Sweeper, 17 inches long, intended for hotels and large rooms. In this article they inform us that they have combined all the latest improvements in the Queen, and have added an additional feature in a tightening pulley, a simple arrangement for adjusting the belt, and, by preventing it from becoming slack, insuring the satisfactory work of the Sweeper. The Queen, with the Rubber Protector, is sold at $18 per dozen, and without the Protector at $16 per dozen. The price of the King Sweeper will be $30 per dozen.

Our readers will be pleased to see on page 33 the advertisement of

SAMUEL A. HAINES

as Hardware Commission Merchant, at 88 Chambers street. Among the manufacturers who will be represented by Mr. Haines are the Starr Bros. Bell Company, East Hampton, Conn., who request us to say that a full line of their samples can be seen at the office of Mr. Haines, who is authorized at all times to quote their best prices and terms, orders entrusted to him receiving the same attention as if sent direct to them.

We have also received a communication from the Norfolk Shear Company, Norfolk, Conn., in which they announce that they have made arrangements with Mr. Haines for the sole agency of their goods, a full line of samples being on exhibition at his office, and he being authorized at all times to quote their most favorable prices and terms. The Norfolk Shear Company are manufacturing a full line of Shears and Scissors (of two qualities), and for which they make special claims as not excelled by any in the market. They propose to issue a new and complete catalogue in about ten days.

We are also informed by J. E. Jenckes, treasurer of the E. Jenckes Manufacturing Company, Pawtucket, R. I., that they have opened an office with Mr. Haines, and that prices and terms on their goods—viz., Bright Wire Goods, Spring Pins and Keys, Belt Hooks, &c.—will be furnished by him.

NEW CATALOGUES AND GOODS.

Romer & Co., Newark, N. J., have just put a new Bycicle Lamp on the market. They say, in reference to it, that its reflector power is not at all interfered with by the signal colors, and add that practical tests thus far have shown that the light is not extinguished by rough-and-tumble usage.

We are in receipt of the catalogue of G. W. Thomas & Co., Toledo Wheelbarrow Works, Toledo, Ohio, for whom W. Dodman is agent, at 107 Chambers street, New York. The catalogue, as we have it, contains supplementary sheets which describe the latest additions they have made to their line of Wheelbarrows. Among these we mention their New Patent Bolted Jointless Bent Leg Garden Barrow, for which they make special claims on account of its lightness and strength, adding that it can be slid on the lawn if necessary, without tearing up the sod or punching holes in it, as the common garden barrow is liable to do. This Barrow has a 20-inch steel wheel, with a 1½-inch tread, is painted, striped and varnished, and has chilled cap-boxes. They are also making their Patent Jointless Bolted Bent Leg Barrow, with their patent combined collar and box, which they furnish with either iron or wood wheels. One of their latest attentions is their Patent Straight Leg Barrow, bolted with tenoned legs and front brace, to render it strong and compact. The catalogue also contains a description of the special features of this line of goods, explaining the method of construction and the way in which the Barrows are knocked down for shipment.

We are in receipt of a handsome and well-arranged catalogue which has just been issued by A. Hammacher & Co., 209 Bowery, New York, importers and jobbers in Upholstery Goods and Trimmings. This catalogue is fully illustrated, having cuts of all the leading goods represented in it, and covers a line of Cabinet-makers' Hardware and a large variety of Tools. In their preface A. Hammacher & Co. say that they will from time to time issue discount sheets in which all changes from present quotations will be noted, but they do not engage to advise their customers of each individual change. The catalogue opens with an exhibit of many different styles of Casters, showing in the same connection Socket Caster Bits, and Brass Caster Rings of a number of different patterns. It then passes on to Cabinet Locks, representing goods of different manufacturers, and giving the Eagle Lock Company's list on these goods in full. After the American Screw Company's Screw list and the lists for Wire Nails, Escutcheon Pins, Finishing Nails, Upholsterers' Tacks, &c., a line of Butts is displayed, followed by a large variety of Hooks, Catches, Sash Lifts, Shutter Bars, &c. As directly connected with the line represented in the catalogue, Perforated Chair Seats, Wood Fillers and French Upholsterers' Nails in many styles are illustrated, as well as Table Legs, Bureau Knobs, Toilet Screws, Furniture Fenders, Turned Walnut Rosettes, Chair Screws, Tilting Irons, Rocker Attachments and many other goods belonging to the same department. We can only direct attention to the display of Mechanics' Tools, to which the last half of the book is devoted, as very satisfactory and complete for the purposes for which it is intended. The whole catalogue is well gotten up, carefully indexed, and is very creditable to the enterprising house which has issued it, to whose increasing business it will undoubtedly contribute. It is accompanied by a pamphlet containing illustrations of Gold and Silver Plated Door Pulls, Toilet Screws, Hat Pins, Escutcheons, Candle Holders, &c., of which a large variety of different styles are displayed. A net price list of these goods is also contained in the pamphlet.

The catalogue of the Hagerstown Steam Engine and Machine Company, Hagerstown, Md., exhibits with illustrations and full descriptions the Engines, Threshers, Clover Hullers, Sawmills, Corn Shellers and Drills of which they are the manufacturers. They mention that since their last circular was issued they have greatly increased their facilities for manufacture by enlarging their old building and erecting commodious new ones, completely furnished with the latest improved machinery, to which they are constantly making additions. They refer to the advantages which result from the location of their works at Hagerstown as a railroad center, giving their customers the benefit of favorable rates of freight and enabling them to produce their machines economically. On another page we give a description of the Empire Clover Huller which they have put on the market the present year.

The attention of the trade is directed to the advertisement on page 37 of B. D. Washburn & Co., 149 and 151 Congress street, Boston, Mass. For the Improved Century Blind Fast special claims are made. The manufacturers mention that it holds the blind securely and noiselessly at any angle, is readily applied to new or old blinds without cutting of blinds or any interference with sash. It is made of steel and wrought metal, and cannot be opened from the outside.

The death is announced, on the 27th ult., at his residence in Reading, Pa., of

JOSEPH L. STICHTER,

the senior member of the well-known house of J. L. Stichter & Son. As a prominent merchant, and one connected with the Hardware business for more than 50 years, his experience dating back to the time when English Hardware was the only kind known, the following sketch of his career, which we are enabled to lay before our readers, will be of interest:

Joseph Lybrand Stichter, son of Peter Stichter and his wife, Elizabeth Lybrand, was born in Reading October 30, 1813. His grandfather, Conrad Stichter, emigrated to America from Lubeck, Germany, in the year 1750, and settled in Reading, where Peter Stichter was born in 1761. At the age of 16 he enlisted in the army of the Revolution, and was with the fragment of the Continental troops under the command of Washington during the dreary winter of 1777 at Valley Forge. Joseph L. received his education in the German and English schools of Reading, and when 15 years of age became an apprentice to the Iron and Hardware trade in the store of Keim & Drenkle, a well-known business firm of that day. He subsequently formed an engagement with the house of Daniel M. Keim & Co., in the same line of business, which was continued up to the year 1837, when he entered into co-partnership with the late John M. Keim, under the firm of Keim & Stichter. In 1841, by the transfer of Mr. Keim's interest to James McKnight, the title of the firm was changed to Stichter & McKnight. This connection was dissolved in 1858 by the retirement of the junior partner, and Mr. Stichter became sole proprietor of the business. In 1871 his son, Thomas D. Stichter, was admitted to partnership with his father, and from that date to this the house has maintained a high and widespread reputation under the name of J. L. Stichter & Son. These several firms always occupied the same premises on East Penn Square, closely adjoining North Fifth street. The site of their present large, commodious and imposing business house was originally owned and occupied by Conrad Weiser, the famous Indian trader and commissioner, who was the official interpreter with the Indians from 1731 to 1753 by appointment of the Provincial Governor of Pennsylvania. The first building was a small two-story log and stone structure, rough-plastered and white-coated, from which circumstance it derived the name of the "Old White Store," by which it was extensively known. This building underwent numerous enlargements and improvements under its successive owners, until it was finally destroyed by fire on January 16, 1872, and was replaced by the present handsome and substantial three-story building, a fitting moument of the enterprise, taste and liberality of its proprietors.

For many years Mr. Stichter was actively identified with the various projects which tended to advance the material prosperity of his native city. From the inception of the Philadelphia and Reading Railroad to the latest day of his life, he was the staunch business friend of this corporation, and came to its aid in more than one financial exigency which for the time impaired its credit. On the 13th of January, 1868, he was elected one of the Board of Directors of the East Pennsylvania Railroad Company, and was continued annually in the same office to the present time. He took especial interest in the affairs of the Berks County Agricultural and Horticultural Society, and was for a long time one of its vice-presidents, and chairman of some of its most important committees. At the monthly meetings, which he regularly attended, he presented numerous interesting and valuable papers upon agricultural subjects, which were widely circulated. He was all his life a patron and an admirer of music and the fine arts, and did much to develop a taste for their refining influences in the community. He was one of the original members of the Reading Benevolent Society, and for many years its treasurer. He also interested himself in other charitable objects, and contributed toward their support.

In early life (1833) he joined the Protestant Episcopal Church, and in the affairs of the church at large, as well as of his own particular parish, he took a very sincere and earnest interest. He was for years a faithful teacher in the Sunday School of Christ Church and a member of the choir. Of the various successive temporal and charitable undertakings of Christ Church he was a zealous promoter, and also a liberal contributor thereto.

Mr. Stichter was married October 23, 1845, in St. Stephen's Church, Philadelphia, to Elizabeth H., daughter of Thomas Diehl, a well-known merchant of that city. His wife and three children survive him—Thomas D. Stichter, Lillie D. Stichter and Ella L., wife of Henry Millholland.

From the appreciative tributes which are paid to Mr. Stichter, it is evident that the city and county loses one of its most energetic business men and most reputable and useful citizens. By his last will and testament his interest in the business of J. L. Stichter & Son will remain, and it will be conducted in the same manner and under the same firm name as before.

BUSINESS ITEMS.

The Upson Nut Company, Unionville, Conn., have opened a branch office and warehouse at 232 Lake street, Chicago, where they will carry a stock of goods of their own manufacture, also the manufactures of the Hotchkiss & Upson Company, the Upson & Hart Company, and the Standard Rule Company. M. Hecklinger, Jr., recently with Wood, Tramel & Co., will be in charge and will be pleased to see the friends and customers of the Upton Nut Company when in the city. They mention that in executing large orders they prefer to ship direct from the factories, while small orders and those requiring immediate delivery will be filled from Chicago stock.

Morley Bros., East Saginaw, Mich., have appointed W. Dodman, 107 Chambers street, as their direct representative for the sale of their "Blue Line" Lumbering Tools, on which he is authorized to give their most favorable terms. Their sheet describing these goods contains cuts of such articles as their Common Sense Peavey, Common Peavey, Cant Hooks, Driving Pikes, Pike Poles with Pike and Hook, Skidding Tongs, Hooks and Clasps of different patterns, Boot Calks, Grab Hooks, Chain Rafting Tongs, Marking Hammers and Lumbermen's Rules. We learn that these manufacturers are about to put on the market a novel arrangement of a Ladder which is original with them, and is said to have some valuable features, being so adjusted upon sheaves and a rail extending along the lines of shelves as to be moved easily in either direction while a person is upon it.

The Sidway Rule and Level Works, Niagara street, Buffalo, N. Y., have established themselves in a part of the building of the Francis Axe Company, for the manufacture of Boxwood Rules, Levels, &c. They report large orders in hand for specialties of their manufacture.

Guthrie & Clifton, Axle manufacturers, Buffalo, N. Y., have appointed W. Dodman, 107 Chambers street, their direct representative in New York for their Axles and Shaft Couplers. They inform us that he will at all times be furnished with their lowest prices.

Heinz & Munschauer, of Buffalo, N. Y., manufacturers of Patent Refrigerators, Bird Cages, Water Coolers, Toilet Ware, &c., are moving into works which have just been finished, at the corner of Superior and Randall streets, in that city. The building to which they are removing is an L-shape of brick and stone, and has a frontage on Randall street of 230 feet and a depth of 50 feet, and on Superior street 100 feet front by 40 feet. The main part of this building is three stories and the rest four stories.

Notice is given that the partnership lately subsisting between Wm. K. Rice and Fred A. Bagg, of Adams, Mass., under the firm name of Rice & Bagg, was dissolved on the 27th ult. by mutual consent. The debts owing to the partnership are to be received by Wm. K. Rice, to whom also all demands are to be presented for payment.

In this issue, on page 38, the advertisement of H. S. McLeod, Troy, N. Y., appears, calling attention to the New Process Cupola Daub. By its use it is claimed that the clinker is prevented from adhering so tightly to the cupola.

LOCKS.

As we go to press we are informed that the Lock Association held a meeting in New Haven to-day, at which existing prices and terms were confirmed.

New York Iron Market

American Pig.—The only demand to be noted is for small lots, and even such orders are not numerous. It might naturally be supposed that in the absence of any business of consequence prices would droop, but, while that may be true of some other branches of the Iron trade, it does not seem to hold good as regards Pig Iron. We can hear of no change of any consequence in the rates which have now prevailed for a long time. Production is evidently not in excess of consumption, and the absence of pressure to sell secures this remarkable steadiness in prices. No. 1 X is no more plentiful than it has been, and Gray Forge is almost as scarce. No. 2 X is in good supply, but concessions are not easily obtained, although rumors are current of offers of standard brands from second hands below regular quotations. As compared with last week, the situation seems to be no better and no worse. Standard Lehigh brands are quoted as follows, tidewater delivery: No. 1 X Foundry, $20 @ $21; No. 2 X Foundry, $19 @ $19.50; Gray Forge, $17.50 @ $18.50. Outside brands, 50¢ @ $1 lower.

Scotch Pig.—Little of importance transpired under this head during the week. Such transactions as occurred were of small lots, generally for mixture with No. 2 X American, to take the place of 1 X. Arrivals aggregated some 1200 tons, principally sold to arrive, as usual. Prices show but little change from last week, though some brands may be had at a shade under our quotations, which are as follows: Gartsherrie, $21.25 to arrive, $22 from yard; Shotts, $21.50 to arrive, $22 from yard; Langloan, $21.50 to arrive; Carnbroe and Glengarnock, $21.50 to arrive, $22 from yard; Coltness, $21.50 to arrive, $22 from yard; Summerlee, $21 to arrive; Dalmellington, $20 to arrive; Eglinton, $19.50 to arrive; Clyde, $20.50 to arrive.

Bessemer Pig.—Inquiries are lacking, and prices are wholly nominal in the absence of any semblance of business. Importations might be made at a shade under $20, but such a figure is entirely too high for consumers to pay, considering the price they are now receiving for their products and the cost of domestic Bessemer as well, which can be had at about $18 @ $19 at furnace.

Spiegeleisen.—The dullness in the Rail trade causes a slack demand for this material. We are reported very light sales. The nominal quotation for 20 % is still $28.

Bar Iron.—Extreme quiet has again prevailed in this branch of trade, orders for mill lots having been few and small. Consumption has dwindled to very narrow limits, and low prices do not stimulate trade to any extent. The outlook is not promising for any increase in business in the near future, with summer at hand when many kinds of work are pushed but languidly. Store trade shows a little improvement as compared with the previous week, but not enough to make trade active. We continue to quote prices as follows: Best Refined, from store, 2.1¢ @ 2.25¢; at mill, 1.85¢ @ 2.05¢; Common Iron, from store, 2¢ @ 2.1¢; at mill, 1.65¢ @ 1.75¢.

Structural and Shaped Iron.—The building interest is contributing very lightly just now to the volume of trade, but there is a little inquiry for Bridge work on the market. Quotations are as follows: Angles, 2.4¢ @ 2.6¢ from store; Tees, 2.9¢ @ 3¢ from store; Beams and Channels, 3.5¢ on wharf for round lots.

Plate Iron.—The transactions of the week were somewhat larger than usual, though not of such a nature as to indicate any general improvement. A 50-ton lot of Tank Iron was sold at a very low figure, delivered on dock. We quote, for small lots, the following prices: Common or Tank, 2.1¢; Refined, 2.7¢; Shell, 3¢; Flange, 3¼¢; Extra Flange, 4½¢ @ 5¢.

Sheet Iron.—The demand is fair for mill lots of both Heavy and Light Sheets, but prices show no improvement. Store trade is as inactive as ever. We quote prices in our New York Wholesale Price List.

Merchant Steel.—The situation presents no new features. For some brands, especially those standing highest among machinists, the demand is fair and trade is satisfactory, but in other directions the demand is very feeble and trade languid. We continue to quote store prices as follows: American Tool Steel, 10¢, with a concession to large buyers; Crucible Machinery, 6¢; Bessemer and Open-Hearth Machinery, 3¼¢ @ 4¢; Tank Steel, 4¢; Boiler Plates, 4½¢ @ 5¢, with extra for special sizes; English Tool, 15½¢.

Steel Rails.—So far as actual business is concerned, the condition of affairs shows no change from that reported last week. No sales of any consequence have taken place for Eastern delivery, but a Western Pennsylvania mill has sold 1200 tons, for delivery in Ohio, on private terms. Inquiries are still floating about from roads which would like to buy on time, but roads which are able to pay cash are not in the market to any extent. The cheapness of Rails is now attracting the attention of would-be buyers, but as those roads which need Steel Rails most and are most anxious to buy are least able to produce the necessary equivalent, the mills lose the benefit of the increased business which ought to accompany the present rates—unprecedented in this country. It is a remarkable fact that Steel Rails can now be purchased at a lower price than Iron Rails were ever sold for on this side of the Atlantic. We quote $32 @ $32.50 at Eastern mills for ordinary lots, but for large lots and favorable deliveries concessions from these rates could be obtained.

Steel Wire Rods.—Orders have been in the market for small lots only during the past week. The falling off in the demand for Barb Wire is unfavorably affecting the demand for Rods, and importers are anticipating a dull period, though some of the large Wire mills have laid in such small stocks that they must occasionally make purchases to continue in operation for current business. Quotations are still nominally $47.50 @ $48 for future delivery, with spot lots possibly a little dearer.

Old Rails.—With an ample supply in view, buyers are indisposed to take hold, but content themselves with picking up small lots when they actually need them. Still, holders are not forcing their stocks on the market regardless of consequences, and prices are pretty well sustained in view of the circumstances. The only sale reported during the week was one of 150 tons at $19, delivered at Bridgeport, Conn., to go East. Offers have been made of $1 less for large lots, which have been refused. We quote the market quiet at $19 asked.

Wrought Scrap.—Actual business is very light, no sales of any consequence coming to our notice. We continue to quote $21 @ $22 for No. 1 Wrought from yard, according to location.

Metal Exchange.

We are reported the following transactions as having occurred on the floor of the Exchange from Wednesday noon of last week to Wednesday noon of this week:

TUESDAY, June 3.

10 tons Straits Tin, Oct..... .....$0.1875

WEDNESDAY, June 4.—First Call.

10 tons Billiton Tin, July..... .19

The above transactions are all that occurred during the week, which was excessively dull. The Exchange was only open on five days, Decoration Day having been observed as a holiday.

INDUSTRIAL ITEMS.

MAINE.

Fay & Scott, machinists, of Dexter, have purchased of F. W. Hill the property known as the Copeland Mill site, and are at work on a machine shop and foundry, which they expect to move into about September 1. The machine shop is to be built of brick, 40 x 80 feet, and two stories high. The size of the foundry is not yet decided, but it will also be built of brick. Their business is the manufacturing of machinists' tools, such as lathes, shapers, milling machines, planer centers, &c.

MASSACHUSETTS.

E. Duxton & Son, of Worcester, have bought 237 old mules of the Blackstone Manufacturing Company, for old iron. The company have put in the James Crown mules, of Pawtucket, which turn off more work.

The Pratt Foundry Company, of North Carver, have purchased land at South Abington, and will commence the erection of buildings immediately. They manufacture stove and range repairs, funnel irons, shakers, &c., and after their removal to South Abington will add repairs for machinery.

On the 2d inst. the first heat of Bessemer steel was made in the State. The Washburn Iron Company, of Worcester, put their steel converters into operation on that day, and the results were very satisfactory.

RHODE ISLAND.

The Brown & Sharpe Manufacturing Company, of Providence, are engaged in erecting a new brick extension to their extensive works. The new addition will be four stories in hight and about 80 feet long.

NEW YORK.

The Francis Axe Company have resumed the manufacture of their goods at their new and elegant works, 430 to 438 Niagara street, Buffalo. These works are upon an area of 118 x 280 feet. The dimensions of the principal building, which is of brick, are 92 x 118, five stories and Queen Anne roof. The factory has been fitted with machinery and appliances of the most approved makes for the manufacture of axes, picks, &c.

NEW JERSEY.

Walter Scott & Co. are erecting a machine shop and foundry at Plainfield, for the manufacture of all kinds of printing machinery as well as general foundry and machine work. The buildings now in course of erection are of brick and will be of the following dimensions: Machine shop, 350 x 62 feet, two stories, each story 15 feet high; smith shop, 80 x 32 feet; boiler-room, 35 x 32 feet; engine-room, 45 x 32 feet. The foundry will be 130 x 70 feet, with wings 16 feet high, and center 30 x 24 feet high, to accommodate a traveling crane of 10 tons' capacity. The shops will be fitted with traveling and walking power cranes, and rails will be laid through the entire set of buildings. The siding from the Central Railroad is now being put in. The works will occupy 6½ acres and will be finished by August 1.

DELAWARE.

F. T. Clymer, manufacturer of carriage, coach and hearse bodies and carriage parts, at Wilmington, has enlarged his smithshop for making gears, and has put in three new machines.

J. R. Bringhurst, proprietor of the Marshallton Iron Works, manufacturer of all grades of sheet iron, at Marshallton, will put in a new sheet mill, storehouse and annealing house, and put in new train rolls, one puddling and two heating furnaces and two pairs shears. Mr. Bringhurst has booked several large orders, and cannot add any new ones for delivery prior to September.

The Wilmington Malleable Iron Company, manufacturers of refined malleable-iron castings, have erected a brick addition to their foundry, covering 27,000 square feet, and put in three Baker blowers and an engine, and have also built additional ovens and furnaces. They have been running full since January 1, with prospects good for the coming year.

PENNSYLVANIA.

George Mallory, an expert in shipbuilding affairs, has been appointed by the creditors of the American Shipbuilding Company, at Philadelphia, now in the hands of a receiver, to examine the assets of the firm, with a view of discharging the receiver and allowing the concern to continue business.

A three-masted iron schooner was launched by the American Shipbuilding Company, at Philadelphia last week, intended for the West India trade

The Continental Machine Tool and Iron Works—Louden & March—successors to B. Graves Louden, Twenty-second street and Washington avenue, Philadelphia, have recently furnished a 1500-ton hydraulic press for shipment to New York City; also one 100-ton press and a 42-inch planer for Philadelphia parties, which are said to present some entirely new features.

Considerable discussion has been excited in Reading, Pottsville and throughout the anthracite region by the preparations being made by the Philadelphia and Reading Railroad Company to pay their employees in scrip instead of cash. Nearly all the miners, however, have received their April wages in cash.

The Penn Hardware Works, of Reading, have recently shipped a very large consignment of builders' hardware to England. They are now employing 300 hands.

The work of removing the *débris* at the Saucon Iron Company's furnace, at Hellertown, the lining of which burned through recently and caused a cessation of operations, is going steadily on. The quarrymen in the employ of the company are idle, but the other employees are at work repairing the furnace. It will take several weeks probably before the furnace is in operation again.

The fire at the Hollidaysburg Iron and Nail Works, referred to in our last issue, entirely destroyed the nail factory of the company, the rolling mill being left unharmed. The origin of the fire is unknown. The loss on the building will, of course, be total, and also on most of the machinery and tools, with the exception of the engine, which is probably not entirely destroyed. The loss is partially covered by insurance. The factory will be rebuilt at once.

PITTSBURGH AND VICINITY.

The reduction of 15 per cent. offered by the stove manufacturers of Pittsburgh and Allegheny to the molders has been rejected by the workmen and the works are now shut down. The meeting of the Molders' Union ratified the action of the members in refusing to accept the reduction, and the strike was declared legal. They decided to resist to the end the reduction offered, and there is no telling when the works will start up. The manufacturers declare their inability to continue operations unless they secure a decrease in the cost of production. They claim that the settlement of the strike in Albany, by which the manufacturers secured a strong advantage over the workmen, gives the manufacturers there a strong advantage over those here. The Eastern men can undersell the market here despite any efforts they may make, and the reduction was made with a view to holding their trade. The last strike that occurred with the union lasted nine months and the men were finally defeated.

The Tenth and Sixteenth street mills of Oliver Bros. shut down last week for an indefinite period. The mills have only been running three days a week for the last two months. Lack of orders is the cause of the shut-down. About 1000 men are thus thrown out of employment.

On last Monday an order was issued from the miners' general office, requesting a suspension of work in the river mines until the trouble is arranged in the Third Pool. At the miners' meeting held at Monongahela City on Saturday a committee was appointed to secure statistics relating to the mines in the Third Pool for the past 17 months and make their report to the executive committee at the miners' picnic this week. On June 10 a convention of delegates of the whole river will be held to discuss prices and try and form a uniform rate in the various pools.

Chess, Cook & Co. closed the puddling department in their rolling mill, at the foot of Nineteenth street, Southside, on May 29. How long the shut-down will continue depends upon the number of orders received. About 500 men are thus thrown out of employment.

There is trouble at the Volta Iron Works, at Apollo, in consequence of the employees becoming members of the Amalgamated Association. The mill has been shut down indefinitely, P. H. Laufman, the senior member of the firm, declaring that it will never be operated by union men. President Weihe, of the Amalgamated Association, who organized the new lodge, thinks the firm will surrender before the men give in.

MARYLAND.

One stack of the Ashland furnaces, at Ashland, was blown out on May 31.

KENTUCKY.

The Fred J. Myers Manufacturing Company, of Covington, manufacturers of wire and iron work of all kinds, report several extensive contracts on hand for prominent bank buildings, and are very busy at present, running their establishment on night turn.

WEST VIRGINIA.

The Black Band Iron and Coal Company, on Davis Creek, are working from 75 to 100 men, including miners and day hands. They are getting out over 100 tons of block coal a day, and increasing this output as rapidly as possible. The coal mined is of a very superior quality. The weather does not have any effect on it whatever. These mines have been operated only a short while, and the coal has not been thoroughly advertised, but where known it stands as high as any on the market. The iron ore obtained is very fine, and the company contemplate putting their Bettie Furnace in blast some time this summer.—*Kanawha Gazette.*

OHIO.

The New York and Ohio Iron and Steel Company, of Ironton, are rearranging the machinery in their rolling mill. An engine has been purchased from the Belfont Iron Works Company, with which they will run their muck train, leaving the engine now in position for the sheet rolls alone. Much trouble has arisen from the present arrangement, which will on the new plan be obviated.

The Walker Manufacturing Company, of Cleveland, are at present running their works overtime, and are very busy on their specialties, which comprise machine-molded gearing, shafting, pulleys, &c. Their shipments for May were more than double those of any month of the year.

The fire at the Kelly Nail and Iron Company's mill, at Ironton, last week, was quite a serious affair. The flames originated from a spark from the nail plate rolls, which ignited the roof of the mill. The entire forge, a building 275 feet long and from 60 to 100 feet wide, was burned to the ground in 20 minutes, every effort to gain control of the flames being fruitless. The firemen, however, succeeded in saving the nail factory, which was very close to the rolling mill, and the blacksmith shop, thus preventing a much more serious loss. The amount of damage done is not yet exactly known. All the machinery is doubtless more or less injured; some of the furnaces may have to be rebuilt; the end of the nail factory, which is cracked, may have to come down; the battery of boilers is injured, and three iron stacks, 50 feet high, fell, and will have to be replaced. A large part of the factory roof was also burnt. The mill will be rebuilt as soon as the insurance companies settle.

The Ironton Hoe and Tool Works have shut down for several weeks, or until trade brightens.

The assignees of the Ward Iron Company, at Niles, paid another dividend of 35 per cent. on the labor claims last Saturday.

The Whipple Manufacturing Company, of Cleveland, have just secured a valuable accession in Mr. H. N. Elwell, late manager of the Norwalk Lock Company, of Norwalk, Conn., who has assumed the management of the business of the Whipple company. This company will this season erect an extensive foundry for the manufacture of a special line of brass goods.

ILLINOIS.

In the burning of the Sibley warehouse, at Chicago, on the 25th ult., the Iowa Barb Wire Company lost four carloads of wire and 500 post-hole augers, valued at $5000, which they had stored in the building, insured for $1000. The Metal Roofing Company also suffered a loss of $3000 on tin plate which they had stored in the same building. The latter party carried no insurance on their goods.

Roach, Cann & Co.'s tile factory, at Decatur, was destroyed by fire on the 25th ult. The fire was caused by the bursting of a kiln. The machinery was badly damaged. The loss is about $7000, with small insurance.

R. W. Reedy's elevator works, at Chicago, were destroyed by fire last Friday. The fire originated in the blacksmith shop and extended through the entire building. Machinery and stock on hand were valued at about $50,000, most of which will be a total loss. The building, which is owned by Mr. Reedy, was valued at $25,000, and is badly damaged. The amount of insurance has not been ascertained.

TENNESSEE.

The old La Grange Furnace, of Danville, has been torn down and replaced by an entirely new stack of 11-foot bosh and 65 feet high, with Weimer patent charger. The furnace will be blown by two engines from two sets of boilers. It has an entirely new hot blast and is expected to turn out 45 to 50 tons of metal per day. From the well-known character of their ores an excellent quality of foundry iron may be expected, as the furnace will run principally for this grade, and will be blown in June 15.

The foundations for the addition to Hoyt & Bros. Manufacturing Company's machine shops, at Aurora, are laid. The structure, which is to be 60 x 70, will be ready to receive the machinery within 30 days. This will give the company about one-third more floor room. They are bringing out some new designs of machinery, which will shortly be placed on the market.

The Aurora Silver Plate Company, of Aurora, are enlarging and refitting their sample-room. They are also building an addition on the north end of their factory. It is to be 30 x 20, four stories in hight. On each floor are fire-proof vaults with double iron doors. These are designed to hold molds, patterns, chucks, flat ware and other valuables. The firm report sales a little larger than last year at this time.

Greenlee Bros.' new foundry, now in course of erection in Chicago, will be completed this week. It is to be occupied by the Northwestern Stove Company. The foundry is to be 50 x 121. It is built of brick and has a truss roof.

The Ajax Forge Company have this week taken possession of the frog shops of the late Union Iron and Steel Company, at Bridgeport, and are going into the manufacture of frogs and crossings. The works have a capacity of 20 frogs a day and two crossings a week.

The Northwestern Horse Nail Company, at Brighton, are running full time and turning out about 5 tons of nails per diem. Although business in this branch is somewhat dull, they report that up to date their sales are considerably in excess of those of the corresponding period last year.

MISSOURI.

The Laclede Rolling Mills, at St. Louis, are running single turn, except on their sheet mill, and their production has fallen to 200 tons a week, 300 tons less than when working full. They have only four puddling furnaces on out of 21.

Broderick & Bascomb, of St. Louis, have nearly completed the erection of their wire works, recently destroyed by fire. The buildings will be considerably larger than they formerly were, and the additional machinery to be used will increase the capacity. Lathes, planers, &c., have already been placed in the works, and the manufacture of the wire-working machinery to be used will be begun immediately.

The Granite Iron Rolling Mills, of the St. Louis Stamping Company, have put in an additional blower of large size to drive their charcoal and hollow fires. Their "hollow-fire" furnace, which has recently been built and put in operation, is a novely in this country.

WISCONSIN.

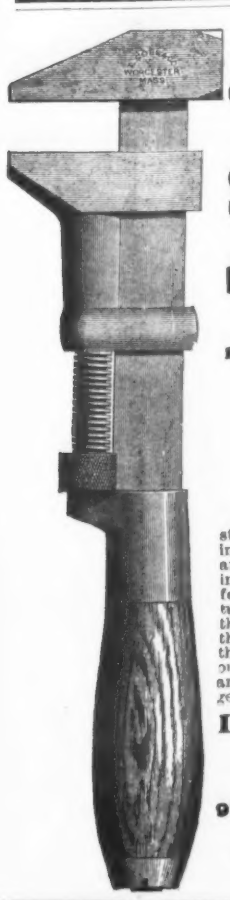
It is understood that arrangements have been made with the Chicago and Northwestern Railroad by C. Sprang & Co., which will obviate the necessity of blowing out their Florence Furnace. They were about to take this action on account of high freight rates.

The first steel nails ever made in Wisconsin were turned out at Bay View a few days ago. The nails were "eight pennies." The material used was Bessemer steel. They were made simply as an experiment, and the outcome of the experiment was satisfactory in every respect, the nails being perfect of their kind. There is a good deal of industrial activity at Bay View just now. The two blast furnaces are making about 1300 tons of iron per week, all of which is consumed in the local works of the North Chicago Rolling Mill Company and at Chicago. The puddle mill, the bar mill and the fish-plate mil are running night and day, working a double turn of men. The nail mill is working up to the limit of its capacity with a single force of men, turning out 1000 kegs of nails per day.

Messrs. Bergstrom Bros. & Co., Neenah, Wis., are improving their plant by the addition of a new engine and boiler house. The engine is of the Reynolds-Corliss type, from the shop of Messrs. E. P. Allen & Co., of Milwaukee, and boilers and other machinery of the latest improved patterns from Eastern parties. They report that they are now running every floor full and melting more iron than at any previous time. The firm is comparatively a new one, having been in operation but a few years. Their new catalogue, which will be issued in time for the fall trade, promises to be very attractive, and will contain an increased line of stoves and ranges for either wood or coal, and especially adapted to the trade of the West and Northwest.

An Arizona Copper Enterprise.—An exchange says: "The Arizona copper mine, under English management, by its recent report is shown to be 'in a state of hopeless insolvency,' and the only hope of avoiding further loss to the stockholders is 'by immediately winding up and abandoning the enterprise.' The concern is in debt £206,150 ($1,330,750), and to meet this there is £101,417, consisting mainly of £93,408 in 'calls' upon the stockholders, but not loud enough as yet to call any of them up to the captain's office."

T. R. Timby, of Nyack, N. Y., has patented an apparatus for treating ores in order to remove sulphur, arsenic and other matter. The inventor employs a jacketed cylinder, mounted upon longitudinal and transverse trunnions, with movable bearings, so that it may be rotated on transverse pivots for charging and discharging, and on its apex for agitating the contents. The apparatus is provided with pipes to admit and discharge superheated or other steam to the jacket surrounding the cylinder. It has also one or more pipes and man-holes communicating with the interior chamber, for the introduction and removal of materiel to be treated, and for the discharge of aqueous and other vapors which are thrown off by the heat. An exhaust through the discharge-pipes creates more or less of a vacuum. By the aid of this nearly complete vacuum, and by the alternate heating and cooling of the ores, various deleterious matters, it is claimed, may be effectually discharged therefrom.



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PATENT

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Makers of SNATHS, CRADLES, FORKS, HOES, RAKES, &c.,

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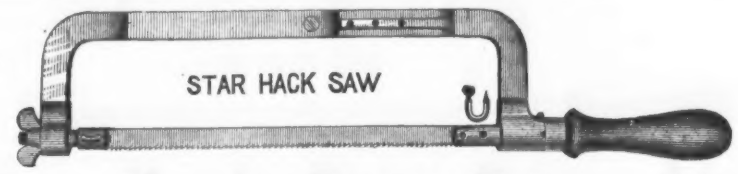

Star Hack Saw Price List.

PRICE OF BLADES.

Length of Blade	6 inch.	7 inch.	8 inch.	9 inch.
Price per Dozen Blades	55	60	65	70 cents.

PRICE OF STEEL FRAMES PER DOZEN.

No. 1 Extension Frame, Polished and Nickel Plated, per Dozen	$9.60
" 2 Solid " " " " " "	8.40

SMITHTOWN, SUFFOLK COUNTY, N. Y., June 2d, 1884.

MILLERS FALLS CO., 74 Chambers St., New York:

My Dear Sirs—I bought one of your No. 2 Star Hack Saws from G. & C. Pasfield, of Brooklyn, E. D. It is a little over a week ago, and I want to say this in favor of the Saw: I had a large log saw brought to me to be gummed out. It was a cast-steel plate, 3-16 inch thick. I cut it all out with one little saw blade, fully 50 running inches. It made a very perfect job when done. I consider the above a very remarkable feat for one Hack Saw Blade. I am a blacksmith by trade, and could not be induced to part with that little tool if I could not get another. I am truly yours,

B. T. WILLIAMS.

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Forged Horse Nails.

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HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

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Bonney's New Hand Vise.

No. 105, Without Handle.

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1st. Both jaws open and close simultaneously, so that anything held therein is not only central, *but on a line with the handle*—a great advantage in filing, &c.

2d. It is hollow, allowing a rod to pass entirely through it, as shown in cut. A desirable feature, often saving much valuable stock.

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ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our **C. H. No. 1 Boiler Plates,** which we manufacture expressly for the **Shells** of Steam Boilers and stamp **50,000 pounds T. S** when desired. **One hundred and sixteen tests** of this iron, made during the last three years by the **U. S. Inspectors of Steam Vessels,** show an **average tensile strength** of **58,808 pounds** to the sectional square inch, and an **average reduction of area** of the fractured section of **30½ per centum** Our prices are as low as the production of a good article will admit of.

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RIVETS

CLARK & COWLES, - - - - - - - - ALL KINDS OF RIVETS. - - Plainville Conn.

English Letter.

(*From Our Regular Correspondent.*)

LONDON, ENG., May 19, 1884.

THE WEEK

has again been uneventful in the main, albeit there have been several reflex symptoms arising out of the great financial scare in New York. These frequent panics with you are watched with deep interest here by financiers and commercial men, and no opportunity is lost by the publicists of citing them as being necessary features of your fiscal system. Whether that supposition is or is not an accurate one I need not stay to consider, but it is certain that the effect of the present panic will be adverse to trade prospects on both sides of the Atlantic. This circumstance, coupled with the rejection of the Morrison bill and the general improbability of any favorable tariff legislation this year—to say nothing of the approaching Presidential campaign—seem to render the American market more than ordinarily stale, flat and unprofitable to our manufacturers. The great Mr. Vanderbilt is expected here by the Germanic daily, and may possibly enlighten our expectant public as to the precise effects of the Wall street rout upon general trade on your side. He is reported to come partly on railroad business, but the rail men fear he does not bring them orders similar to those placed for several years past on the occasion of his spring visits to Europe.

The discussion at the recent meeting of the Iron and Steel Institute on the relative merits and demerits of iron and steel for shipbuilding purposes seems likely to bear some fruit in official circles which have considerable powers of encouragement or repression in such matters. Some of the steel manufacturers had an interview last week with Sir Thomas Farrer, secretary of the Board of Trade, and with Mr. Traill, the board's engineer in-chief. The deputation laid before these officials a largely-signed memorial praying for the early and unconditional removal of the restrictions at present imposed upon the use of steel for shipbuilding purposes. It was suggested that a committee should be appointed to consider and revise the tests, and it was further asked that the testing of iron should also be rendered obligatory, inasmuch as iron of the cheapest and worst quality was now used for shipbuilding purposes. The reply of Sir Thomas Farrer was decidedly favorable, his view being that steel should find more favor with shipowners, as it combines all the advantages of economy, durability and increased cargo room. Generally speaking, he would not promise anything, but would make known to the president of the board the views of the deputation. In consonance with usual precedents something will be done, probably, before long to give effect to the very reasonable claims of the steel manufacturers.

The International Health Exhibition which has just been opened at South Kensington, London, is fast being got into shape and is pretty certain to be a "big go" during the summer and autumn. It stands in the very center of fashionable London, on the same site as last year's Fisheries Exhibition, and being laid out attractively, so as to please as well as instruct, will be a pleasant lounge for the idler as well as an instructive resort for the sanitarian—professional or amateur.

TECHNICAL EDUCATION.

The members of the Royal Commission on Technical Education, of which Mr. B. Samuelson, M. P., is chairman, have at length brought their three years' labors to a close, and have issued their report. This is a voluminous, yet most valuable, document, and will present a vast fund of useful information to the British public. The commissioners have visited the United States and all parts of the Continent of Europe—and that, too, at their own expense—and have spared no pains in order to arrive at a just and proper conclusion. They admit and point out the enormous industrial progress made outside Great Britain of late years. They point out the positive superiority of the Germans in all pursuits where chemistry comes into play, and they concede that in certain mechanichal appliances the Swiss, Belgians, French, Germans and Americans (United States) are fairly alongside us. At the same time, they lay stress upon the fact that almost all the leading mechanical inventions of world-wide renown are still made in Great Britain, and that the Continent has not produced other than second-rate discoveries. The great bulk of the report prevents me from dwelling upon it at greater length on this occasion, but I think it advisable to give you a summary of the recommendations of the commissioners, made with a view of keeping us ahead in technical matters. These recommendations, in brief, are as under:

1. As to Public Elementary Schools: (A) That rudimentary drawing be incorporated with writing as a single elementary subject, and that instruction in elementary drawing be continued throughout the standards. That the inspection of the Education Department, Whitehall, be responsible for the instruction in drawing; that drawing from casts and models be required as part of the work, and that modeling be encouraged by grant. (B) That there be only two class subjects instead of three in the lower division of elementary schools, and that the object lessons for teaching elementary science shall include the subject of geography. (C) That after reasonable notice a school shall not be deemed to be provided with proper "apparatus of elementary instruction," under Article 115 of the Code, unless it have a proper supply of casts and models for drawing. (D) That proficiency in the use of tools for working in wood and iron be paid for as a "specific subject," arrangements being made for the work being done, so far as practicable, out of school hours; that special grants be made to schools in aid of collections of natural objects, casts, drawings, &c., suitable for school museums. (E) That in rural schools instruction in the principles and facts of agriculture, after suitable introductory lessons, shall be made obligatory in the upper standards. (F) That the provision, at present confined to Scotland, which prescribes that children under the age of 14 shall not be allowed to work as full-timers in factories and workshops, unless they have passed in the fifth standard, be extended to England and Wales.

2. As to clauses under the Science and Art Department and grants by the department: (A) That school boards have power to establish, to conduct and to contribute to the maintenance of classes for young persons and adults (being artisans under the Science and Art Department); that in localities having no school board the local authorities have analogous power. (B) That the Science and Art Department shall arrange that the instruction in these science subjects which admit of it shall be of a more practical character than it is at present, especially in the honors stage; that payment on results be increased in the advanced stages of all subjects, at least to those now made for practical chemistry and metallurgy, and that greater encouragement be given to grouping. (C) That the examinations in agriculture be made to have a more practical bearing. (D) That metallurgy, if it be retained, be divided into groups, as (1) the precious metals; (2) those extracted from metalliferous mines, as copper, tin, lead, &c.; (3) that iron and steel mining be similarly divided into (1) coal and (2) metalliferous mining. (E) That the inspection of science classes by the Science and Art Department, with a view to ascertain the efficiency of the instruction and of the apparatus and laboratories, be made effective with the assistance, where necessary, of local sub-inspectors. (F) That it shall not be a requirement of the Science and Art Department that payment of fees be demanded from artisans for instruction in the science and art classes. (G) That in the award for industrial design regard be had to the material in which it is to be executed, and that special grants be made for the actual execution of designs under proper safeguards. (H) That the limits of the building grants under the Science and Art Department to £500 each for schools of arts and science should be abolished, and the conditions attached to the grants be revised. (J) That in addition to the loan of circulating collections, and the grant of art reproductions at reduced cost, contributions be made to provincial industrial museums of original examples, tending to advance the industries of the district in which such museums are situated.

3. Training Colleges for Elementary Teachers: (A) That the teaching of science and art in training colleges, and its inspection by the Science and Art Department, be made efficient, and that arrangements be made for giving to selected students in those colleges, greater facilities and inducements for the study of art and science in the National Art Training School and the Normal School of Science at South Kensington, the Royal College of Science for Ireland, and other institutions of a similar class approved of by the Government.

4. Secondary and Technical Instruction: (A) That steps be taken to accelerate the application of ancient endowments, under amended schemes, to secondary and technical instruction. (B) That provision be made by the Charity Commissioners for the establishment in suitable localities of schools or departments of schools in which the study of natural science, drawing, mathematics and modern languages should take the place of Latin and Greek. (C) That local authorities be empowered, if they think fit, to establish, maintain and contribute to the establishment and maintenance of secondary and technical (including agricultural) schools and colleges.

5. Public Libraries and Museums: (A) That ratepayers have power by vote to sanction the increase of the expenditure under the Public Libraries acts beyond its present limit, and that the restriction of the acts to localities having 5000 inhabitants and upward be repealed. (B) That museums of art and science and technical collections be opened to the public on Sundays.

THE IRON MARKET

is very quiet in all directions, and there are no indications of an early improvement. In some quarters, indeed, it is held that we are by no means at the bottom of the depression, and that almost, or quite, all the present year will be required to complete the processes of weeding out and readjustment. In the meantime increased severity of competition and constantly decreasing prices must lessen the output, and give the chance of a nearer balance between supply and demand. At Glasgow the warrant market has been greatly depressed as regards values, as low as 41/5 ℔ ton being quoted on May 12, the minimum level for a very long time past. Since then there has been an improvement, chiefly by reason of buying in by the "bears," and values advanced, but closed at 41/5½ ℔ ton. Scotch pig shipments are still poor, and below last year's figures, while the stock in Connal's store is much heavier than was the case a year ago. The special brands of Scotch pig are nominal in price, but are to be had at about 6d. @ 1/ ℔ ton less money than 10 days ago. At Middlesboro' and throughout the North of England pig iron remains dull and irregular, No. 3 being quoted at 36/6 @ 37/ ℔ ton, makers' naturally being highest. With the shipments, as they are, on a relatively limited scale, and the marked decrease of local consumption, it would seem that the make is still too large; consequently, it is not surprising to hear of a contemplated further restriction of the production. In hematite pig iron there is still no life, and selling values are quite nominal on the basis of 45/6 @ 46/6 for mixed lots in usual proportions. Rail deliveries are not heavy, but there are respectable coastwise shipments to South Wales and Scotland. Elswhere there does not appear to be a single feature in respect of crude iron worthy of being specially noted. Fair deliveries are being made in fulfillment of running contracts, but the surplusage does not move off freely, and there are reasons for assuming that the smelters are not in reality so firm in their quotations as they are represented to be in some quarters. The works devoted to the manufacture of plates and other kinds of shipbuilding iron are badly employed, and seem likely to lay off even more plant than is idle already. Large numbers of workmen are unemployed, and I fear there is no likelihood of their being reinstated. Fortunately it is not winter, and there is the chance of many of the men being absorbed by agricultural or other pursuits. Fencing wire is without change other than the minor one of a more settled state of things at the works, owing to the settlement of one strike on terms very much in accordance with the views of the employers. Galvanized iron is irregular and nominal, with poor prospects, according to my recent advices from Australasia. Ordinary finished iron is in slack demand, and prices are perhaps more irregular than at any former juncture. Nominally, however, all the leading quotations are unaltered, every transaction being settled on its own merits and irrespective of "list" or other published figures. There is a moderate turnover in bars, sheets and hoops, as well as in tire, chain and cable iron, but in no case is there any real activity at the works. For old rails the inquiry is slack, D. H. being nominal at from 57/6 to 62/6 ℔ ton, the lowest rates being f.o.b. at outports, and the highest in London, according to Messrs. Austin & Co. and F. Pitts & Co., of London. There is no export business doing in heavy wrought scrap iron, although good No. 1 is obtainable at rather less than 47/6 ℔ ton. Old boiler tubes are 57/6 @ 60/, and cast scrap 40/ @ 45/ ℔ ton for net cash. Freights are unchanged in the main, at late rates, but pig iron by ordinary steamers—Glasgow to New York—is rather easier at 4/ @ 4/6 ℔ ton. Steel is dull and in moderate request only, the Siemens concerns being probably the best employed in the whole trade. The new Bessemer works at Cyparbsipa are on the eve of completion, and will add largely to the means of production in this country. Cross ends are growing scarcer, and are called about 52/6 ℔ ton, f.o.b., South Wales, &c., for export lots. Steel rails are very quiet, and new orders are scarce, although several specifications for India, &c., are in the market at the present time. The association prices are firmly upheld at £4. 18/6 for D. H., or bullheads, up to £6. 7/6 for 14 lb to 18 lb ℔ yard sorts of flanges.

TIN PLATES.

There has been something in the nature of a scare in the open market, the ominous reports from New York having induced the fear that there may be a sharp contraction of American purchasing during the remainder of the year. At the same time makers do not appear to be seriously alarmed, the majority of them having ample work on hand. Currently a steady business is reported in cokes, especially steel with coke tinning. An average quotation is 15/3 @ 15/6, makers' highest. Wasters are in fair request at about 14/3 @ 14/6 ℔ box. Charcoals and ternes remain quiet. Messrs. Caine & Layborne, of Liverpool, advise me: "The market is fairly steady, with a moderate business doing. Second-hand parcels continue scarce. Special B V grade brands maintain recent prices well, but, on the whole, prices are a little easier, and unless buying is on a larger scale, a lower level is only too likely to be reached before long. Wasters are in good demand, and bring full figures."

SCOTCH PIG IRON

underwent an improvement as regards warrants during the early part of last week, but subsequently relapsed and closed at a low level, owing, as is alleged, to the financial panic in the United States. Why that effect should have sprung from such a cause I fail to see, but the ring at Glasgow are never hard up for an excuse, and this one may serve in default of a better. Nothing more has transpired on the G. M. B. question, but there are suspicious rumors afloat, and the bears are willingly awaiting developments—indeed, the bulls are still "out of the hunt," and are in no position to withstand a further vigorous onslaught from the bear section. There are now 97 furnaces at work in Scotland, as against 95 last week, and 116 this date 1883. In Connal's stores there are 591,924 tons (a decrease on the week of 465 tons), as compared with 579,371 tons a year ago. Last week's shipments were 4371 tons behind those of the same week in 1883, and the total to date this year (201,135 tons) is 19,143 tons in arrears. Middlesboro' imports into Scotland are 3830 tons ahead of last year.

MIDDLESBORO' PIG IRON

is weak and sluggish on the basis of about 36/6 @ 37/ for No. 3, with G. M. B. as below, f.o.b. at makers' wharves in the Tees, net cash:

No. 1 Foundry	41/	Mottled	35/
" 2 "	39/	White	34/6
" 3 "	37/	Refined metal	53/
" 4 "	36/	Kentledge	38/6
" 4 Forge	35/6	Cinder	34/

North of England hematites range from 48/ for No. 1 to 46/6 for No. 3, 4 foundry, 4 forge and mottled. The shipments are moderate to date this month.

WEST COAST HEMATITES

are very much as of late, at 46/ @ 47/ for mixed lots in usual proportions, and makers' brands as below:

	No. 1.	No. 2.	No. 3.
Cleator	49/	48/6	48/
Lonsdale	48/	47/	46/6
Workington	47/	46/6	46/
Lowther	47/	46/6	46/
Distington	47/	46/6	46/
Harrington	48/	47/	46/
Solway	47/	46/6	46/
Maryport	47/	46/6	46/

Last week's shipments included 8030 tons of pig iron and 5930 tons of steel rails—the latter in fulfillment of old contracts.

The Cost of Government Statuary.—Sixteen of the statues erected at Government expense in different parts of Washington have cost $550,000, and it is probable that the Washington Monument, on which work is now progressing, will add $1,000,000 to the total. Chief Justice Marshall's bronze statue, recently unveiled, cost $40,000; Greenough's Washington, at the front of the Capitol, cost $43,000, and the two statues facing it, $24,000 each; the naval monument, on Pennsylvania avenue, $25,000; the statue of Freedom, on the Capitol dome, $23,000; the Emancipation group, $17,000; General McPherson's statue, $15,000; Admiral Farragut's, $20,000; General Scott's, $73,000; General Thomas's, $65,000; Andrew Jackson's, $50,000; General Greene's, $50,000; General Rawlins's, $10,000, and $50,000 for the equestrian statue of Washington.

Wholesale Hardware Prices, June 4, 1884.

HARDWARE.

Anvils.
Eagle Anvils American .... ₩ ℔ 10¢—dis 20 %
Wright's .... 11¢
Armitage's Mouse Hole .... 9½¢ @ 9¾¢
Trenton .... 9¾¢
Wilkinson's .... 10½¢
J. & Riley Carr, Patent Solid .... 11 @ 11¼¢

Anvil Vise and Drill.
Millers Falls Co., $18.00 .... dis 20 %
Cheney Anvil and Vise .... dis 25 ¢

Augers and Bits.
Conn. Valley Mfg. Co. }
C. E. Jennings & Co. }
Humphreysville Mfg. Co. }
Ives }
New Haven Copper Co. } dis 60 %
Beecher (French, Swift & Co.) }
Griswold }
Nobles Mfg. Co. }
Snell Mfg. }
Douglass Mfg Co. Extra }
Cook's Douglass Mfg. Co. .... dis 40&10&10 %
Patent Solid Head .... dis 30 %
Lewis' Patent Single Twist .... dis 45 %
Russell Jennings' Augers and Bits of all kinds, List of January 1, 1884 .... dis 25 %
Imitation Jennings' Bits (old list) .... dis 60 %
Ives' "Jennings" Bits (old list) .... dis 50&10 %
Snell Mfg. Co.'s Jennings' Bits (old list) .... dis 50 %
Expansive Bits, Clark's small, $18; large, $26 .. dis 20&10 %
Expansive Bits, Ives' No. 4, per doz., $60 .... dis 25&10 %
Expansive Bits, Blake's .... $20—dis 40 %
Expansive Bits, Derby, $17 and $36 .... dis 40&10 %
Expansive Bits, Ansonia .... dis 25 %
Hollow Augers, Ives' } dis 25 %
Hollow Augers, French, Swift & Co. }
Hollow Augers, Douglass' .... dis 25 %
Hollow Augers, Bonney's Adjust, ₩ dz. $48 .... dis 40 %
Hollow Augers, Stearns' Adjust. ₩ dz. $48—dis 20&10 %
Hollow Augers, Ives' Expansive, each $4.50—dis 40&10 %
Hollow Augers, Universal Expan., each, $4.50—dis 20 %
Wood's .... dis 25 %
Gimlet Bits .... $7.50 ₩ gross, dis 50 %
Gimlet Bits, Diamond .... ₩ doz. $1.10, dis 25&10 %
Gimlet Bits, "Bee" .... dis 25 %
Double Cut Gimlet Bits, Shepardson's .... dis 40 %
Double Cut Gimlet Bits, Ct. Valley Mfg. Co. .. dis 30&10 %
Double Cut Gimlet Bits, Hartwell's .... dis 60 %
Double Cut Gimlet Bits, Douglass' .... dis 40 %
Double Cut Gimlet Bits, Ives' .... dis 50 %
Boltz Bit Stock Drills .... dis 25&10 %
L'Hommedieu's Ship Augers .... dis 15 %
Watrous's Ship Augers .... dis 15 %
Snell's Ship Augers .... dis 15 %

Awl Hafts.
Sewing, Brass Ferrule .... $3.50 ₩ gross—dis 40&10 %
Patent Sewing, Short .... $1.00 ₩ doz—dis 40&10 %
Patent Sewing, Long .... $1.20 ₩ doz.—net
Patent Peg, Plain Top .... $10.00 ₩ gross—dis 40&10 %
Patent Peg, Leather Top .... $12.00 ₩ gross—dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common .... ₩ gross $1.70—dis 25&10 %
Awls, Shouldered Peg .... ₩ gross $2.45—dis 25&10 %
Awls, Patent Peg .... ₩ gross 63¢—dis 25&10 %
Awls, Shouldered Brad .... $2.70 ₩ gross—dis 25&10 %
Awls, Handled Brad .... $7.50 ₩ gross—dis 25&10 %
Awls, Handled Scratch .... $7.50 ₩ gross—dis 25&10 %
Awls, Socket Scratch .... $1.50 ₩ gross—dis 10&10 %
Brad Sets, Aiken's .... ₩ doz. $10.00—dis 50&10 %
Millers Falls Adj. Tool Handles .... ₩ doz $12—dis 25 %
Brad Sets, No. 42, $10.50; No. 43, $12.50 .... dis 70&10&5 %
Brad Sets, Stanley's Excelsior, No. 1, $7.50 }
Brad Sets, Stanley's Excelsior, No. 2, $4.00 } dis 25&10 %
Brad Sets, Stanley's Excelsior, No. 3, $5.50 }

Axes.—Best grades.
Regular, Bronzed .... per doz $7.25
Double Steel, Bronzed .... add .75
Triple Steel, Bronzed .... add 1.00
Steel Pole, Bronzed .... add 1.00
Full Polished .... add .50
Beveled .... add .50

Double Bit Axes.
Regular, Bronzed .... per doz $12.00
Steel Pole, Bronzed .... add 1.00
Full Polished .... add 1.00
Beveled .... add 1.00

Axle Grease.
Frazer's, in bulk .... Keg ₩ ℔, 5¢; Pail, ₩ ℔, 6¢ net
Frazer's, in boxes .... ₩ gross $10.00 net

Axles.—Standard list .... dis 50 %

Balances.
Spring Balances .... dis 40 %

Bells.
Hand, Light Brass .... dis 70&10 %
Hand, Extra Heavy .... dis 55 %
Hand, White Metal .... dis 70 %
Hand, Silver Chime .... dis 20&10 %
Hand, Globe (Cone's Patent) .... dis 25&10 %
Gong, Abbe's .... dis 20&10 %
Gong, Yankee .... dis 30&10 %
Gong, Barton's .... dis 30&10 %
Crank, Taylor's .... dis 25&10 %
Crank, Brooks' .... dis 50&10&2 %
Crank, Cone's .... dis 10 %
Crank, Connel's .... dis 15&10 %
Lever, Sargent's .... dis 55&10 %
Lever, Taylor's Bronzed or Plated .... net
Lever, Taylor's Japanned .... dis 25&10 %
Lever, R. E. M. Co.'s .... dis 50&10&2 %
Lever, Reading .... dis 25&10&10 %
Pull, Brook's .... dis 50&10&2 %
Pull, Western .... dis 25&10 %
Call .... dis 25 %
Cow, Common Wrought .... dis 55&10 %
Cow, Western .... dis 20&10 %
Cow, Western, Sargent's new list .... dis 60&10&10 %
Cow, Kentucky "Star" .... dis 20&10 %
Cow, Kentucky, Sargent's new list .... dis 60&10&10
Cow, Dodge, Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog	
	$12.00	10.00	9.00	8.00	7.00	5.00	3.50	2.50	5.00	dis 60 %

Cow, Texas Star .... dis 50 %

Bellows.
Blacksmiths' Common .... dis 50 %
Blacksmiths' Extra Pittsburgh Pattern .... dis 20 %
Molders' .... dis 25 %
Hand Bellows .... dis 20 %

Belting, Rubber.
Standard .... dis 70&5 %
Extra .... dis 60&10 %

Bench Stops.
Hotchkiss's .... ₩ doz $5.00—dis 10 %
Weston's .... per doz No. 1, $10; No. 2, $9—dis 25&10 %
McGill's .... ₩ doz $3—dis 10 %
Morrill's .... ₩ doz $9—dis 50 %

Bit Holders.
Extension, Barber's .... ₩ doz $15.00—dis 40&5 %
Extension, Ives' .... ₩ doz $20.00—dis 40 %
Diagonal .... ₩ doz $24.00—dis 40 %
Angular .... ₩ doz $24.00—dis 40&5 %

Blind Adjusters.
Domestic .... ₩ per doz $3.00—dis 30 %
Excelsior .... ₩ doz $16.00—dis 50&10&2 %

Blind Fasteners.
Mackrell's .... ₩ doz pairs, $1.00—dis 20&10 %
Van Sand's Screw Pattern .... $9 ₩ gro.—dis 10&2 %
Van Sand's Old Pattern .... $9 ₩ gro.—dis 10&2 %
Washburn's Old Pattern .... $9 ₩ gro. net
Merriman's .... new list, net
Salisbury & Austin No. 2008 .... $9 ₩ gro. net
Security Gravity .... $9 ₩ gro. net

Blind Staples.
Barbed, ½ in. and larger .... ₩ ℔ 9½¢ net
Barbed, ⅜ in. .... ₩ ℔ 11½¢ net

Blocks
Cleveland Block Co. .... dis 40 @ 40&10 %
Penfield Block Co., I. R. and I. strap'd. } New List. dis 40 %
Penfield Block Co., W. I. C. bushed } dis 40 %
Penfield Block Co., W. I. all steel roll's } dis 20 %
Penfield Block Co., L. & I. Sheaves } dis 40 %
Bagnall & Loud, Wood, new list .... dis 40 %
Bagnall & Loud, Iron, new list .... dis 30 %
Stanley Rule & Level Co.'s .... dis 40&10 %

Bolts
Cast Iron Barrel, Square, &c. .... dis 55&10 %
Cast Iron Shutter Bolts .... dis 60&10 %
Cast Iron Chain (Sargent's list) .... dis 65&10 %
Ives' Patent Door Bolts .... dis 55&10 %
Wrought Barrel .... dis 55&10 %
Wrought Square .... dis 55&10 %
Wrought Shutter, all Iron, Stanley's list .... dis 50&10 %
Wrought Shutter, Brass Knob, Stanley's list .... dis 40 %
Wrought Shutter, Sargent's list .... dis 55&10 %
Wrought Sunk Flush, Sargent's .... dis 75&10 %
Wrought Sunk Flush, Stanley's .... dis 50&10&5 %
Wrought B. K. Flush, Com'n Stanley's .... dis 65 %
Carriage and Tire Common .... dis 85&5 %
C. B. & Co. .... dis 80&10 @ 80&20 %
Carriage and Tire, Philadelphia, new list .. dis 70&10 %
Carriage and Tire, Philadelphia pattern .... dis 70&5 %
R. B. & W., Carriage, old list .... dis 70 %
Tire, American Screw Co.'s, Philadelphia, new list, July 2, 1883 .... dis 75 %
Tire, "Bay State," new list, July 2, 1883 .... dis 65 %
Tire, R. B. & W., 3-16 and ¼, Philadelphia list .. dis 80 %
Tire, R. B. & W., 5-16 and ⅜, Philadelphia list .. dis 70 %
Stove—American Screw Co.'s .... dis 60 %
Stove, R. B. & W. .... dis 60 %
Stove, R. & E. Mfg. Co. .... dis 57½ @ 60 %
Plow .... dis 55 %
Plow, R. B. & W. .... dis 50 %
Machine .... dis 75 %
Bolt Ends .... dis 75 %

Borax .... 12¢ @ 12½¢ ₩ ℔ net

Boring Machines.

	Upright.	Angular.
First quality, no Augers	$5.50	$6.75 .... dis 50 %
Phillips, with Augers	7.00	7.50 .... net
Jennings & Co., no Augers	5.50	6.75 .... dis 45 %
Saunders' Pat., Regular Bed	6.00	— .... dis 20 %
Saunders' Pat., Extra Bed	6.50	— .... dis 20 %
Hubbard's	2.50	3.00 .... Net

Bow Pins.
Humason, Beckley & Co.'s, Nos. 1 and 2 .... dis 60 %
Humason, Beckley & Co.'s other Nos. .... dis 70 %
Sargent & Co.'s .... $19.70 and $21.40, dis 66⅔&10 %
Hotchkiss .... dis 25 %
Peck, Stow & W. Co. .... dis 30&10 %

Braces.
Q. S. Backus .... dis 50&5 %
Barber's .... dis 40&5 %
Spofford's Patent .... dis 50&5 %
Ives' Patent Braces .... dis 55&10 %
Common Ball, American .... dis 55 %
Amidon's .... dis 50 %
Bartholomew's, Nos. 25, 27, 30 .... dis 50 %
Bartholomew's, Nos. 117, 118, 119 .... dis 60 %
Barker's Imp'd .... dis 55 %
Empire .... dis 30 %
Buffalo Ball .... dis 40 %

Brackets.
Shelf, plain .... dis 50&10 %
Shelf, fancy .... dis 60&10 %
Reading, plain .... dis 55&5&10 %
Reading, Rosette .... dis 60&5&10 %

Bright Wire Goods.
List of June 25, 1883 .... dis 70&10&— %

Broilers.—Henis' Self-Basting.

Inch	9	10	9 x 11
Per doz.	$4.50	5.50	6.50

Bull Rings.
Union Nut Co. .... dis 55 %
Sargent's .... dis 66⅔&10 %
Hotchkiss' low list .... dis 15 %
Humason, Beckley & Co.'s .... dis 70 %
Peck, Stow & W. Co.'s .... dis 33⅓&10 %

Butts
Wrought Brass .... dis 80 %
Cast Brass, Tiebout's .... dis 40 %
Cast Brass, Corbin's Fast Joint .... dis 20&10 %
Cast Brass, Loose Joint .... dis 10&10 %
Fast Joint, Narrow .... dis 40&10&10 %
Fast Joint, Broad .... dis 40&10&10 %
Loose Joint .... dis 60&10 %
Loose Joint, Japanned .... dis 60&10 %
Loose Joint, Japanned with Acorns .... dis 60&10 %
Parliament Butts .... dis 60&10 %
Mayer's Hinges .... dis 60&10 %
Loose Pin, Acorns .... dis 60&10 %
Loose Pin, Acorns, Japanned .... dis 60&10 %
Loose Pin, Acorns, Jap'd, Plated Tips .... dis 60&10 %

WROUGHT IRON.
Fast Joint, Narrow .... dis 60&2½ %
Fast Joint, Lt. Narrow .... dis 60&2½ %
Fast Joint, Broad .... dis 60&2½ %
Loose Joint, Broad .... dis 60&7½ %
Table Butts, Back Flaps, &c. .... dis 60&2½ %
Inside Blind, Regular .... dis 60&2½ %
Inside Blind, Light .... dis 60&2½ %
Loose Pin, Wrt. .... dis 60&7½ %
Loose Pin, Light .... dis 60&2½ %
Bronzed Wrought Butts .... dis 40&5 %
Spring Hinges:
Geer's Spring and Blank Butts .... dis 30 %
Union Spiral Spring, Japanned .... dis 25 %
Union Spring Hinge Co.'s .... dis 25 %
American Spring Hinge Co.'s .... dis 30 %
Gem Spring Hinges .... dis 30 %
Barker's Double Acting .... dis 20 %
Union Mfg. Co. .... dis 25 %
Bommer's .... dis 25 %
Buckman's .... dis 25 %
Empire .... dis 60 %
Acme .... dis 70 %
Climax .... dis 50&10 %
Blind Butts, Parker .... dis 70&2 %
Blind Butts, Palmer .... dis 50&10 %
Blind Butts, Seymour .... dis 70&2 %
Blind Butts, Lull & Porter .... dis 75&10 %
Blind Butts, Nicholson .... dis 45&10 %
Blind Butts, Huffer .... dis 50 %
Blind Butts, Clark's, Nos. 1, 3, 5 .... dis 75&2 %
Blind Butts, Manhattan Hardware Co. .... dis 70 %
Blind Butts, Sargent's, Nos. 1, 3 .... dis 66⅔&10 %
Blind Butts, Sargent's, No. 12 .... dis 70&10 %
Blind Butts, Reading's Gravity .... dis 66⅔&10 %
Blind Butts, Shepard's "Noiseless," Nos. 50, 60, 65, 45 and 55 .... dis 70 %
Blind Butts, Shepard's "Gravity," Nos. 1, 3 and 5 .... dis 70&10 %
Shepard's Lull & Porter Shutter Hinges .... dis 70&10 %
Shepard's Reversible Shutter Hinges .... dis 70&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3 .... dis 60&10 %

Butcher's Cleavers.
Humason & Beckley Mfg. Co. .... dis 25 %
Bradley's .... dis 25 %
Beatty's .... dis 33⅓ %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

New Haven Edge Tool Co.'s .... dis 30&10 %

Calipers .... See Compasses

Can Openers.
Messenger's Comet .... ₩ doz $3.00, dis 25 %
American .... ₩ gross $3.00, dis 30 %
Duplex .... ₩ doz 25¢, dis 15 @ 20 %
Lyman's .... ₩ doz $3.75, dis 20 %
No. 4, French .... ₩ doz $2.25, dis 55 %
No. 5, Iron handle .... ₩ gross $6.00, dis 30 %
Eureka .... ₩ doz $2.50, dis 10 %
Sardine Scissors .... ₩ doz $7.00, dis 55 %
Star .... ₩ doz $5.00, dis 25&5 %
Sprague, No. 1, $2; No. 2, $2.25; No. 3, $2.50 .. dis 50&10 %
"World's Best," ₩ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00 .... dis 50&10 %
Universal .... ₩ doz $3.00, dis 35&5 %
Domestic .... ₩ doz $2.50, dis 45 %
Champion .... ₩ doz $2.00, dis 50 %

Caps—Percussion, ₩ 1000.
Hicks & Goldmark's
F. L. Waterproof, 1-10's .... 50¢ }
E. B. Trimmed Edge, 1-10's .... 65¢ }
E. B. Ground Edge, Central Fire, 1-10's .... 70¢ } dis 10&10 %
Double Waterproof, 1-10's .... $1.40 }
Pistol Waterproof, 1-10's .... 75¢ }
Musket Waterproof, 1-10's .... 80¢ }
G. D. & S. B. .... 33¢, dis 10 %
Eley's E. B. .... 60 % net
Eley's D. Waterproof, Central Fire $1.50
U. M. C., F. C. trimmed .... 50¢ } dis 15&10 %
U. M. C., F. L. ground .... 70¢ }
U. M. C., Cen. fire ground .... 70¢ } dis 10&5 %
U. M. C., Double W. Proof .... $1.40 }
Double Waterproof, in 1-10's .... $1.40 } dis 10 %
Colt's Pistol, in 1-10's .... 75¢ }
Musket, in 1-10's .... 80¢, dis 33⅓ %

Cartridges.
Rim .... List of Jan. 1, 1884—dis 50&10 %
Central Fire .... " " " dis 33⅓ %

Cards.
Horse and Curry .... dis 10 %
Cotton .... New list, Aug., 1883, dis 10 %
Wool .... " " " dis 10 %

Carpet Stretchers.
Cast Steel, Polished .... ₩ doz $5.00, dis 30 %
Cast Iron, Steel Points .... ₩ doz $2.00, dis 50&5 %
Socket .... ₩ doz $2.50, dis 25 %
Bullard's .... dis 25 %

Carpet Sweepers.
Bissell No. 5 .... ₩ doz $17.00
Bissell No. 7 New Drop Pan .... ₩ doz $19.00
Bissell No. 12 Hall Sweeper .... ₩ doz $42.00
Mystic .... ₩ doz $17.00
Cottage .... ₩ doz $15.00
Garland .... ₩ doz $19.00
Queen .... ₩ doz $16.00
Queen, with band .... ₩ doz $18.00
King .... ₩ doz $30.00

Casters.
Bed .... dis 50 %
Plate .... dis 50 %
Shallow Socket .... dis 50 %
Deep Socket .... dis 50 %
Yale Casters, reduced list May, 1884 .... dis 25&5 %
Martin's Patent (Phœnix) .... dis 25 @ 33⅓ %
Payson's Anti-friction .... dis 50 %

Cattle Leaders.
Humason, Beckley & Co.'s .... dis 70&10 %
Sargent's .... dis 70&10 %
Hotchkiss .... dis 25 %
Peck, Stow & W. Co. .... dis 33⅓&10 %

Chain.
Trace, 6½-10-2 .... ₩ pair 79¢ }
Trace, 6½-10-3 .... ₩ pair 70¢ } dis 45@45&5 %
Trace, 7-10-2 .... ₩ pair 86¢ }
German Halter Chain, list of Dec. 31, 1881 .... dis 55 %
German Coil, list of Dec. 31, 1881 .... dis 55 %

English Coil	3-16	¼	5-16	⅜	7-16	½
	$0.10	.08½	.07¼	.06½	.06	.05¾
American Coil	3-16	¼	5-16	⅜	7-16	½
	$0.10	.07	.06¼	.05½	.05	.04¾

Covert Halter, Hitching and Breast .... dis 35&5 %
Meneely's Breast, Halter and Hitching .... dis 50&10 %
Oneida Halter Chain (old list) .... dis 45 %
Galvanized Pump Chain .... ₩ ℔ 7¢
Jack Chain, Iron .... dis 65&10 %
Jack Chain, Brass .... dis 65&5 %

Chalk.
White .... ₩ gro 60¢ net
Red .... ₩ gro 80¢ net
Blue .... ₩ gro $1.00 net
White Crayons .... ₩ gro 12½¢ net

Chalk Lines.—See Lines.

Chisels.
Socket Framing, Crossman .... dis 65&5 %
Socket Framing, Arlington Edge Tool Co. }
Socket Framing, Witherby Tool Co. }
Socket Firmers, Arlington Edge Tool Co. } dis 70 @70&10 %
Socket Firmers, Witherby Tool Co. }
Socket Corner }
Socket Framing and Firmer, Buck Bros. .... dis 27½ %
Socket Framing and Firmer, Douglass .... dis 70&10 %
Socket Framing and Firmer, Merrill .... dis 65&10 %
Socket Firmer, Framing, &c., L. & I. J. White .. dis 20&5 %
Tanged Firmers .... dis 45 %
Tanged Firmers, Butcher's .... $4.75 @ $5.00
Tanged Firmers, Spear & Jackson's .... $5.00 to £
Tanged Firmers, Buck Bros. (Shank) .... $5.25 to £

Clamps.
Iron, Providence Tool Co.'s Wrought Iron .... dis 25 %
Iron, Adjustable, Gray's .... dis 20 %
Iron, Adjustable, Lambert's .... dis 20 %
Iron, Adjustable, Snow's .... dis 40&5 %
Iron, Adjustable, Hammer's .... dis 15 %
Iron, Adjustable, Stearns' .... dis 20&10 0
Iron, Cabinet, Sargent's .... dis 70&10 %
Iron, Carriage Makers', Sargent's .... dis 65&10&10 %
Iron, Eberhard Mfg. Co. .... dis 40&5 %
Saw Clamps .... See Vises

Clips, Axles.
Norway or Best .... dis 60&10 %
Superior .... dis 70 %

Cockeyes .... dis 40 %

Cocks, Brass.
Racking .... dis 55 %
Globe .... dis 55 %
Plain Bibbs .... dis 55 %
Ale and Beer .... dis 55 %

Coffee Mills.
Board and Box .... dis 50 %
Selsor's Patent .... $9.50, $10.50, dis 25 %
American, Enterprise Mfg. Co. .... dis 20&10 %
The "Swift," Lane Bros. .... dis 20&10 %
Webb's Patent .... dis 45 @ 50 %

Compasses, Dividers, &c
Compasses .... dis 60 %
Calipers .... dis 60 %
Dividers .... dis 60 %
Bemis & Call Co.'s Dividers .... dis 70&5 %
Bemis & Call Co.'s Compasses & Calipers .... dis 50&5 %
Bemis & Call Co.'s Wing & Inside or Outside .dis 50&5 %
Bemis & Call Co.'s Double .... dis 60 %
Bemis & Call Co.'s (Call's Patent Inside) .... dis 30 %
Excelsior .... dis 50 %
Cook's Extension .... dis 25 %
J. Stevens & Co.'s Calipers and Dividers .... dis 25&10 %

Coopers' Tools.
Bradley's .... dis 10 @ 20 %
Barton's .... dis 20 %
L. & I. J. White .... dis 20&5 %

Corkscrews.
Humason & Beckley Mfg. Co. .... dis 33⅓ %
Clough's Patent .... dis 33⅓ %

Corn Knives and Cutters.
Bradley's .... dis 10 %
Wadsworth's .... dis 25 %

Crow Bars.
Cast Steel .... ₩ ℔ 5½¢
Iron, Steel Points .... ₩ ℔ 4¼ @ 4½¢

Curry Combs.
Fitch's .... dis 50&10 %
Hotchkiss, Novelty, new list, July, 1880 .... dis 33⅓ %
Hotchkiss, Excelsior Supr. Champion .... dis 33⅓ %
Rubber .... ₩ doz $10.00, dis 25 %

Curtain Pins.
Silvered Glass .... net
White Enamel .... net

Cutlery.
American Pocket .... Net prices
American Table .... Net prices
Wostenholme .... $8.00 to £

Dividers .... See Compasses

Dog Collars.
Embossed Gilt .... dis 30&10 %
Leather .... dis 40 %
Brass .... dis 40 %

Door Springs.
Torrey's Rod, regular size .... ₩ doz $3, dis 50 %
Gray's .... ₩ gro, $20.00, dis 20 %
Bee Rod .... ₩ gro, $20.00, dis 20 %
Warner's No. 1, ₩ doz, $2.50; No. 2, ₩ doz, $3.30 dis 40 %
Gem (Coil):
No. 1, Large Japanned .... ₩ doz $4.00 }
No. 2, Medium, Japanned .... ₩ doz 2.75 } dis 50&10 %
No. 3, Small, Japanned .... ₩ doz 2.00 }
Star (Coil)—For Cop'd, Nickel-Plated, &c., see list.
No. 4, ("Shoo Fly") Screen Door size, ₩ doz $1.50 }
No. 5, Screen Door size .... ₩ doz 2.00 } dis
No. 6, Medium .... ₩ doz 2.75 } 60 %
No. 7, Large .... ₩ doz 4.00 }
Philadelphia .... 5 in., $5.00; 8 in., $7.75, dis 35 %
Cowell's .... No. 1, ₩ doz $18.00; No. 2, $15.00, dis 50 %
Rubber, complete .... ₩ doz $2.25, dis 20&10 %
Hercules .... dis 50 %
Shaw Door Check and Spring .... dis 25 @ 30 @ 35 %

Drawing Knives.
Arlington Edge Tool Co. .... dis 70 %
Crossman's No. 1 .... dis 65&5 %
Merrill .... dis 65&10 %
Nobles Mfg. Co. .... dis 15 %
L. & I. J. White .... dis 20 %
Bradley's .... dis 35 %
Adjustable Handle .... dis 20 %
Witherby Tool Co. .... dis 70 %
Douglass .... dis 70&10 %

Drills and Drill Stocks.
Blacksmiths' .... each, $2.50, dis 20 %
Blacksmiths' Self-Feeding .... each, $7.50, dis 20 %
Breast, P. S. & W. .... dis 20&10 %
Breast, Hotchkiss' .... dis 20 %
Breast, Wilson's .... dis 25 %
Breast, Millers Falls .... each, $3.00 dis 25 %
Breast, Bartholomew's .... each, $2.50, dis 25&10 %
Ratchet, Merrill's .... dis 20 %
Ratchet, Ingersoll's .... dis 25 %
Ratchet, Whitney's .... dis 20&10 %
Ratchet, Weston's .... dis 20 %
Ratchet, Moore's Triple Action .... dis 25@30 %
Whitney's Hand Drill, Plain, $11.00; Adjustable, $12.00 .... dis 20&10 %
Wilson's Drill Stocks .... dis 10 %
Automatic Boring Tools .... each, $2.25, dis 20 %

Drill Chucks.
Morse's Beach Patent .... each, $8.00, dis 20 %
Morse's Adjustable .... each, $7.00, dis 20 %
Danbury .... each, $8.00, dis 30 %

Egg Beaters.
Dover .... ₩ doz $2.50
Monroe's .... dis 50 %
National .... ₩ doz $4.50, dis 33⅓ %
Standard .... ₩ gro, $18.00, dis 25 %
Family (T. & S. Mfg. Co.) .... ₩ gro, $18.00, net
Acme .... ₩ gro, $12.00, dis 25 %
Triumph (T. & S. Mfg. Co.(.... ₩ gro, $11.50, net

Emery.
Regular numbers .... ₩ ℔ 8¢
Flour and F. F. .... ₩ ℔ 6½¢
For Emery Paper and Cloth, see Sand Paper.

Enameled and Tinned Ware.—See Hollow-Ware.

Escutcheon Pins.
Brass .... dis 55 %

Escutcheons.
Door Lock .... Same discounts as Door Locks
Brass Thread .... dis 55 %
Wood .... dis 25 %

Faucets.
Fenn's .... dis 40 %
Bohren's Patent Rubber Ball .... dis 25 %
Fenn's Cork Stops .... dis 33⅓ %
Star .... dis 55&10 %
Frary's Patent Petroleum .... dis 25&10 %
West's Patent Key .... dis 45 %
Anchor Lock .... dis 45 %
Metallic Key, Leather Lined .... dis 60 %
Cork Lined .... dis 70 %
J. Sommer's Best Block Tin Key .... dis 40& 10 %
J. Sommer's Cork Lined, 1st quality .... dis 50 %
J. Sommer's Diamond Lock .... dis 40 %
Self-Measuring, Enterprise ... ₩ doz $36.00—dis 20&10 %
Self-Measuring, Lane's .... ₩ doz $36.00—dis 20&10 %
Self-Measuring, Victor .... ₩ doz $36.00—dis 25&10 %

Felloe Plates .... ₩ ℔ 10¢, dis 30 %

Files.
J. & Riley Carr .... New list, April 1, 1883, dis 15 %
J. & Riley Carr Horse Rasps .... dis 10 %
Butchers' ....
Moss & Gamble .... New list, dis 15 %
H. Disston & Sons .... dis 40&10 %
Nicholson .... dis 40&10 %
New American .... dis 40&10 %
Union File Co. .... dis 40&10 %
Heller Bros.' Files .... dis 40&10 %
Heller Bros.' Horse Rasps .... dis 30&10 %
Western .... dis 40&10 %
Stubs .... dis 25 @ 30 %

Fluting Machines.
Knox, 4½-inch Rolls .... $3.50 each } dis 35 %
Knox, 6-inch Rolls .... $4.00 each }
Eagle, 3½-inch Roll .... $2.15, dis 35 %
Eagle, 5½-inch Roll .... 2.85, dis 35 %
Crown, 4½ in., $3.50; 6-in., $4.00; 8-in., $6.50 each, dis 35 %
Crown Jewel .... 6-in., $3.50 each, dis 35 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 35 %
Domestic Fluter .... $1.50 each, net
Geneva Hand Fluter, White Metal .. ₩ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00, ₩ doz .... dis 30 %
Shepard Hand Fluter, No. 85 .... ₩ doz $15, dis 40 %
Shepard Hand Fluter, No. 110 .... ₩ doz $8.75, dis 30 %
Shepard Hand Fluter, No. 95 .... ₩ doz $6.50, dis 20 %
Clark's Hand Fluter .... ₩ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron ... ₩ doz $15.00, dis 30 %
Buffalo .... ₩ doz $10.00, dis 10 %

Fluting Scissors .... dis 45 %

Fly Traps.
Paragon .... ₩ doz $3, net

Forks.
Hay, Manure and Spading .... dis 50 %
Plated, A 1, Rogers & Bro. .... dis 50&5 %
Plated, Holmes, Booth & Hayden's .... dis 50&10 %

Fruit and Jelly Presses.
Enterprise Mfg. Co. .... dis 20&10 %

Fry Pans.
Burnished list as follows .... dis 60&10&10

No.	0	1	2	3	4	5	6	7	8
₩ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

"Acme" .... dis 50 @ 55 %

Gauges.
Marking, Stanley's .... dis 55&10 %
Marking, Chapin's .... dis 55&10 %
Wire .... dis 10&10 %
Wire, Disston's .... dis 20 %
Wire, Wheeler, Madden & Co. .... dis 10 %

Gimlets.
Nail and Spike .... dis 50&10 %
"Eureka" Gimlets .... dis 40&10 %
"Diamond" Gimlets .... dis 40&10 %
Double Cut, Shepardson's .... dis 40 %
Double Cut, Ives' .... dis 45&10 %
Double Cut, Douglass' .... dis 40 %
"Bee" .... ₩ gross $12, dis 25 %

Glue Pots.
Tinned and Enameled .... dis 35@35&5 %
Family, Howe's "Eureka" .... dis 40 %
Family, L. F. & C.'s "Handy" .... dis 40 %

Grindstone Fixtures.
Sargent's Patent .... dis 70&10 %
Reading Hardware Co. .... dis 30&10 %

Gun Wads.
U. M. C. B. E., 11 up .... $2.00 }
U. M. C. B. E., 9&10 .... 2.30 }
U. M. C. B. E., 7&8 .... 2.60 }
U. M. C. P. E., 11 up .... 3.10 } dis 5&5 %
U. M. C. P. E., 9&10 .... 4.00 }
U. M. C. P. E., 7&8 .... 4.90 }
Eley's B. E. .... 2.00 }
Eley's P. E. .... 3.00 }

Hack Saws.
Griffin's Hack Saws, complete .... dis 40&10 %
Griffin's Hack Saw, Blades only .... dis 20&10 %

Halters.
Covert's Pat. Rope .... dis 50&10 %
Covert's Hemp Horse and Cattle Ties .... dis 50 %
Covert's Jute Horse and Cattle Ties .... dis 50&10 %
Meneely's Pat. Rope and Web .... dis 40&10 %
Meneely's Horse and Cattle Ties .... dis 40&10 %

Hammers.
Maydole's .... dis 15 %
Cheney's, new list, March, 1883 .... dis 25 %
Hartford Hammer Co.'s Nail Hammers .... dis 20 %
Hartford Machinist, Riveting and Farrier .... dis 25 %
Kip's .... dis 30 %
C. Hammond & Son .... dis 40 %
Humason & Beckley .... dis 15 %
Verree .... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75, dis 25&10 %
Nelson Tool Works .... dis 40&10 %
Warner & Nobles .... dis 10 %
Yerkes & Plumb .... dis 30 %
Wilkinson's Smiths' .... 11½¢ ₩ ℔ net
Heavy Hammers and Sledges .... dis 50&10 %

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ₩ doz .. dis 10 %
Providence Tool Co., Leg Irons, $25.00 ₩ doz .... dis 10 %
Tower's .... dis 25 %

Handles.—Door or Thumb Latches.

Nos.	0	1	2	3	4	
Per doz.	$0.80	1.00	1.18	1.35	1.50	dis 60&10 %

Roggin's Latches .... ₩ doz. 35¢ @ 40¢ net
Bronze Iron Drop Latches .... ₩ doz. $0.80 @ 0.90 net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 .... net
Barn Door .... ₩ doz. $1.60, dis 10&10 %
Wrought Chest .... dis 70 %
Surface Chest .... dis 60&10 %
Flush Chest .... dis 70 %
Lifting .... dis 60&10 %
Saw and Plane .... dis 40&10 %
Boynton's Loop Saw Handles .... 50¢, dis 50 %
Boynton's Centennial Saw Handles .... 30¢, dis 25 %
Hammer and Hatchet .... dis 20 %
Brad Awl .... ₩ gross $2.50, dis 10 %
Hickory Firmer Chisel, assorted .... ₩ gross $4.50 }
Hickory Firmer Chisel, large .... ₩ gross 5.00 }
Apple Firmer Chisel, assorted .... ₩ gross 5.00 }
Apple Firmer Chisel, large .... ₩ gross 6.00 } dis
Socket Firmer Chisel, assorted .... ₩ gross 3.00 } 25
Socket Framing Chisel, assorted .... ₩ gross 5.00 } &
File, assorted .... ₩ gross 2.75 } 10 %
Auger, assorted .... ₩ gross 5.00 }
Auger, large .... ₩ gross 7.00 }
Patent Auger, Ives' .... dis 25 %
Patent Auger, Douglass' .... ₩ set $1.25 net
Patent Auger, Swan's .... ₩ set $1.00 net

Hangers.
Barn Door, old patterns .... dis 60&10 %
Barn Door, New England .... dis 65&10 %
Climax (Anti-Friction) .... dis 55 %
Zenith Anti-Friction Wood Track .... dis 55 %
Reed's Steel Arm .... dis 40 %
Challenge .... dis 50 %
"Champion" Medina Mfg Co. .... $15.00, dis 50&10 %
Sterling Improved (Anti-Friction) .... dis 65&10 %
Double Cut, Hartwell's .... dis 40&10 %
Victor, No. 1, $15; No. 2, $16.50; No. 3, $18 .... dis 33⅓ %
Cheritree .... dis 50 %
Kidder's .... dis 50&10 %
U. S. .... 4 in., $12; 5 in., $15, dis 60 %
The "Boss" .... dis 50&10 %
Terry's Patent .... 5 in., $12; 3½ in., $10, dis 40 %
Cronk .... No. 4, $12; No. 5, $14.40; No. 6, $18, dis 50&5 %
Architect .... ₩ set $6.00, dis 20 %
Felix .... ₩ set $4.50, dis 20 %

Harness Snaps.
Anchor (T. & S. Mfg Co.) .... dis 65 %
Henshaw's, list of 1½ changed to $14.00 .... dis 65 %
Judd's, list of 1½ changed to $14.00 .... dis 65 %
Fitch's (Bristol), list of 1½ changed to $14.00 .... dis 65 %
Hotchkiss .... dis 10 %
Andrews' .... dis 50 %
Sargent's Patent Guarded .... dis 70&10&10 %
German, old list .... dis 75 %
German, Sargent's new list .... dis 60&10 %
Covert .... dis 50 %
Covered Spring, new list, Oct., 1882 .... dis 60&10 %
Meneely's Pat. Safety (Old German list) .... dis 50 %
Meneely's Imp. German (Old German list) .. dis 60&10 %

Hatchets.
Isaiah Blood .... dis 35 %

	Nos.				
Shingling,	Nos. 1 2 3	₩ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	₩ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	₩ doz	7.50	8.00	8.50

Hunt's .... 25 @ 30 %

Shingling,	Nos. 1 2 3	₩ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	₩ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	₩ doz	7.50	8.25	9.00

Hurd's .... dis 35 %

Shingling,	Nos. 1 2 3	₩ doz	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	₩ doz	9.00	9.50	10.00
Lathing,	Nos. 1 2 3	₩ doz	8.00	8.50	9.00

Yerkes & Plumb .... dis 35 %

Shingling,	Nos. 1 2 3	₩ doz	$7.50	$8.00	$8.50
Claw,	Nos. 1 2 3	₩ doz	8.25	8.75	9.25
Lathing,	Nos. 1 2 3	₩ doz	7.50	8.00	8.50

Underhill Edge Tool Co. .... 30 @ 35 %

Shingling,	Nos. 1 2 3	₩ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	₩ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	₩ doz	7.50	8.25	9.00

Lathing, Solid Steel .... dis 30 %
No. 1, $11 Boston Pattern, $14.
C. Hammond & Son .... dis 45 %

Shingling,	Nos. 1 2 3	₩ doz	$8.00	$8.50	$9.00
Lathing,	Nos. 1 2 3	₩ doz	8.00	8.50	9.99
Claw,	Nos. 1 2 3	₩ doz	8.50	9.00	9.50
Broad,	Nos. 1 2 3	₩ doz	11.00	13.50	16.00

Simmons .... dis 30 @ 35 %

Shingling,	Nos. 0 1 2 3	₩ doz	$7.50	$8.00	$8.50	$9.00
Claw,	Nos. 0 1 2 3	₩ doz	....	8.50	9.00	9.50
Lathing,	Nos. 0 1 2 3	₩ doz	....	8.00	8.50	9.00
Broad,	Nos. 1 2 3 4	₩ doz	9.00	10.00	12.00	14.00
Broad,	Nos. 5 6 7 8	₩ doz	16.00	18.00	20.00	22.00

Collins .... dis 10 %

Shingling,	Nos. 1 2 3	₩ doz	$5.50	$6.00	$6.50
Claw,	Nos. 1 2 3	₩ doz	6.00	6.50	7.00
Lathing,	Nos. 1 2 3	₩ doz	5.50	6.00	6.50

Peck's Champion Blade .... dis 35 @ 40 %

Shingling,	Nos. 1 2 3	₩ doz	$8.00	$8.50	$9.00
Lathing,	Nos. 1 2 3	₩ doz	8.00	8.50	9.00
Claw,	Nos. 1 2 3	₩ doz	9.00	9.50	10.00
Half,	Nos. 1 2 3	₩ doz	8.00	8.50	9.00
Broad,	Nos. 1 2 3	₩ doz	10.00	11.00	13.00
Broad,	Nos. 4 5 6	₩ doz	14.50	16.50	18.00
Ax Pattern,	Nos. 1 2 3	₩ doz	10.00	11.00	12.00

Hay Knives.
"Lightning" .... ₩ doz $20, dis 10 %
Wadsworth's .... dis 35 @ 35&5 %
Heath Patent .... ₩ doz $13.50 net

Hinges.
Gate, Western .... ₩ doz $4.90, dis 55 %
Gate, N. E. .... ₩ doz $7.70, dis 55 %
Gate, N. E. Reversible .... ₩ doz $5.75, dis 55 %
Gate, Clark's, Nos. 1 2 3 .... dis 60&10&2 %
Gate, N. Y. State .... ₩ doz $5.05, dis 55 %
Gate, Automatic .... ₩ doz $12.50, dis 50 %
Gate, Common Sense .... ₩ doz pair $4.50, dis 50 %
Gate, Seymour's .... dis 45&10 %
Gate, Shepard's .... Nos. 1, 2, 3, 10, 20 & 25, dis 50&10 %
Reed's Latch and Hinge .... ₩ doz sets $12, dis 50 %
Rolled Blind Hinges .... dis 60&10 %
Rolled Plate .... dis 60&10 %
Rolled Raised .... dis 60&10 %
Plate Hinges { 8, 10 & 12 in., $5.55, ₩ 100 ℔ } .. dis 10 %
"Providence" { over 12 in., $4.50 ₩ 100 ℔ }
Screw Hook and { 8, 10, 12 in., $6.75 ₩ 100 ℔ } .. dis 10 %
Strap { 14 to 36 in., $5.50 ₩ 100 ℔ }
Heavy Welded Hook { 8 to 12 in., $7.50 ₩ 100 ℔ } ... net
{ 14 in. & up, $6.50 ℔ 100 ℔ }
Screw Hook and Eye { ½ in. .... ₩ doz $1.50 } dis
{ ⅝ in. .... ₩ doz $2.45 } 10 %
{ ¾ in. .... ₩ doz $3.80 }
Wrought Scrap and T .... dis 60&10&5&2 % for cash

Hoes.
Riveted Shank .... dis 60&5 %
Socket .... dis 60&5 %
Planters' .... dis 50 @ 50&10 %
Scovill Pattern .... dis 60&5 %
Handled Planters' .... dis 60&5 %
Magic .... ₩ doz $5 net
Grub .... ₩ doz $1, dis 60 %

Hoisting Apparatus.
"Moore's" Hand Hoist, with Lock Brake .... dis 15 %
"Moore's" Differential Pulley Block .... dis 20 %

Hollow-Ware.
Stove Hollow-Ware, Ground .... dis 60 %
Enameled and Tinned Hollow-Ware—
Kettles .... dis 50&10 @ 50&10&5 %
Oval Boilers, Saucepans and Glue Pots .... dis 40 %
Gray Enameled Ware .... dis 50 %
Russless Hollow-Ware .... dis 50&5 %
Galvanized Tea-Kettles—

Inch	6	7	8	9
Per doz.	45¢	50¢	55¢	65¢

Hooks.
Bird Cage, Sargent's list .... dis 60&10 %
Bird Cage, Reading .... dis 40&10 %
Cotton .... ₩ doz $4.00, dis 50 %
Cotton Patented (N. Y. Mallet & Handle W'ks), dis 30 %
Cotton (Humason & Beckley Mfg. Co.) .... dis 40 %
Belt .... dis 80 %
Bench Hooks .... See Bench Stops
Clothes Line, Sargent's list .... dis 65&10 %
Clothes Line, Reading list .... dis 45&5&10 %
Ceiling, Sargent's list .... dis 60&10&10 %
Harness, Reading list .... dis 40&10&10 %
Coat and Hat, Sargent's list .... dis 60&10&10 %
Coat and Hat, Reading .... dis 40&10&10 %
Wire Coat and Hat, Gem .... dis 45 %
Wire Coat and Hat, Miles' .... dis 70 %
Picture Hooks, Brown's Pat. Solid Brass, $4.00 ₩ gross .... dis 25 %
Tassel and Picture (T. & S. Mfg. Co.) .... dis 50 %
Wrought Staples and Hooks & Staples .dis 70&7½&10 %
Wrought Staples, Stanley's list .... dis 70&7½&10 %
Wire Screw Hooks and Eyes .. New list, dis 70&10&— %
Grass and Bush .... dis 55 %
Whiffletree—Patent .... dis 45 %
Hooks and Eyes—Malleable Iron .... dis 60&10 %
Hooks and Eyes—Brass .... dis 60&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10	
Ausable	₩ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 25&10 %
Clinton, Pl'n.	₩ ℔		23¢	21¢	20¢	19¢	18¢	dis 25&10 %
Clinton, Fin.	₩ ℔		24¢	22¢	21¢	20¢	19¢	dis 25&10 %
Essex	₩ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 33⅓ %
Putnam	₩ ℔	27¢	24¢	22¢	21¢	20¢	19¢	dis 5&7 %
Vulcan	₩ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 12½ %
Northwest'n.	₩ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 10&5 %
Globe	₩ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 10&5 %
A. C.	₩ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 10&10&5 %
C. B.-K.	₩ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 10&5 %
Champlain	₩ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 33⅓ %
New Haven	₩ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 33⅓ %
Bridgewater	₩ ℔	24¢	21¢	19¢	18¢	17¢	16¢	dis 30 %
Saranac	₩ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 16⅔ %
Champion	₩ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 10&5 %
Capewell	₩ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 33 %

Horse Shoes.
Burden .... ₩ keg $3.87½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy .... ₩ keg $3.87½
Walker's Forged, Light, Med. or Heavy .. ₩ keg $3.87½
Mule Shoes .... ₩ keg $4.87½
Dunning's Steel .... ₩ keg $9.25

Ice Awls, Chisels, &c.
American Ice Chisel, Pol'd .... ₩ doz $3.00, dis 15 %
National Ice Chisel .... ₩ doz $6.25, dis 20 %
Novelty Ice Breakers .... ₩ doz $6.25, dis 20 %
White's Sliding Head Picks .... ₩ doz $2.50, dis 40 %
Dunlap's Ring Picks .... ₩ doz $2.00, dis 20 %
Wood Head Picks, Sargent's .... ₩ doz $1.60, dis 50&10 %
Iron Head Picks, Sargent's .... ₩ doz $1.25, dis 50&10 %
Ice Mallets, Pick in head .... ₩ doz $1.75, dis 15 %
Ice Mallets, Pick in handle .... ₩ doz $2.00, dis 15 %
Ice Axes, Small Cast or Malleable .. ₩ doz $1.20, dis 10 %
Combination Ice Tools .... ₩ doz $2.00 net

Ice Cream Freezers.
American, Crown and Star .... dis 45 %
Gem .... dis 55 %

Ice Tongs.
Champion .... ₩ doz $6.00, dis 25& 10 %
Family .... ₩ doz $2.75, dis 15 %

Kettles.
Brass, 7 to 17 inches inclusive .... ₩ ℔ 28¢, dis 10 %
Brass larger than 17 inches .... ₩ ℔ 32¢, dis 10 %
Enameled and Tea Kettles .... See Hollow-Ware

Kettle Ears.
Eberhard Mfg Co. .... dis 33⅓ %

Knives.
Ames' Butcher Knives .... dis 20 %
Nichols' Butcher Knives .... dis 40&10 %
Ames' Shoe Knives .... dis 15 %
Ames' Bread Knives .... ₩ doz $1.50, dis 15 %
Moran's Shoe and Bread Knives .... dis 20 %
Hay and Straw .... See Hay Knives
Table and Pocket .... See Cutlery

Knobs.
Carrriage, Japanned .... ₩ gross 80¢, dis 60&10 %
Base, Rubber Tip .... dis 70&10&5 %
Hemacite Door Knobs, new list .... dis 35&5 %
Door Mineral }
Door Por. Jap'd } Same discounts as Door Locks.
Door Por. Plated }
Door Por. }
Furniture Plain .... 75¢ gross inch, dis 10 %
Furniture, Wood Screws .... dis 25&10 %
Picture, Judd's .... dis 60&10&10 %
Picture, Sargent's .... dis 60&10 %
Hemacite, Picture .... dis 35 %
Shutter, Porcelain .... dis 60&10 %

Ladles.
Melting, Sargent's .... dis 50&10 %
Melting, Reading .... dis 30&10 %
Melting, Monroe's Patent .... ₩ doz $4.00, dis 40 %
Melting, P. S. & W. .... dis 30&10 %
Eberhard Mfg. Co. .... dis 33⅓ %

Lanterns.
Tubular, Standard No. 0, ₩ doz $7.50
Tubular, Standard No. 1, ₩ doz 9.00
Tubular, Lift Wire, No. 0, ₩ doz 9.00
Tubular, Lift Wire, No. 1, ₩ doz 10.50
Guards for Tubulars, add ₩ doz .... .25
Police, Small, $6.25; Med., $7.50; Large, $10.00, dis 10 %
Porter's Tin R. R., $10 .... dis 26 %

Lawn Mowers.
Excelsior .... dis 30&5&3 %
Buckeye .... dis 30&5&3 %
Clipper .... dis 30&5&3 %
Pennsylvania .... dis 30&5&3 %
Continental .... dis 30&5&3 %
Philadelphia .... dis 30&5&3 %

Lemon Squeezers.
Porcelain Lined .... ₩ doz. $6.00, dis 35 %
Wood .... ₩ doz. $3.00, dis 35 %
Eureka, Tinned .... ₩ doz. $8.00, dis 10 %
Dunlap's Improved .... ₩ doz. $3.75, dis 20 %
Sammis' .... No. 1, $5; 2, $9; 12, $18 ₩ doz., dis 20&10 %
Townsend's Patent .... $6.00 ₩ doz., dis 33⅓ %
Jennings' "Star" .... $3.00 ₩ doz. net
The "Boss" .... ₩ doz. $4.00, dis 10&10 %
Dean's Nos. 1, ₩ doz. $15.00; 2, $9.00; 3, $5.50, dis 40&10 %

Lines.
Linen Fish .... dis 25&10 %
Cotton Chalk .... dis 55 %
Silver Lake, Braided, Nos. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gross .... dis 20 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50 .... Net
Masons' Colored Cotton .... dis 45 %
Wire Clothes, Galvanized .... each, 25¢@40¢ net

Locks and Latches.
Cabinet, Eagle } Changes made in list price of
Cabinet, Gaylord } some numbers March 10,
Cabinet, P. & F. Corbin } 1884, dis 45&2 % cash.
Cabinet, A. E. Deitz .... dis 30@40 %
Cabinet, Stoddard Lock Co. .... dis 30 %
A. E. Deitz, Flat Key Drawer .... dis 30@40 %
Yale "Standard" Drawer and Desk .... 40&10 %
"Shepardson" or "U. S." .... dis 35 %
"Felter" or "American" .... dis 40&10 %
Eagle Trunk .... dis 15&2 %

DOOR LOCKS, ETC.
Branford }
Norwalk }
Norwich }
P. & F. Corbin }
Nashua } Dis 60&2 %, cash, from Revised List of Dec. 10, 1883
Russell & Erwin }
Mallory, Wheeler & Co. }
Nimick & Brittan Hardware Mfg. Co. }
Whipple Mfg. Co. }
Reading Hardware Co. (rev. list Jan. 2, '84) .. dis 60&10 %
Plate .... dis 33⅓&2 %
F. Many's "Extension Cylinder" .... $10.50 ₩ doz net
Barnes Mfg. Co. .... dis 40 %
Yale Flat Key .... dis 40 %
Dietz Flat Key .... dis 30 %
Stoddard .... dis 30 %
Langstroth & Crane's:
Round Key Latches .... dis 40&10 %
Flat Key Latches .... dis 33⅓&10 %

PADLOCKS.
Russell & Erwin }
Mallory, Wheeler & Co. }
Nimick & Brittan Mfg. Co. } Dis 45&2 %, cash, from Revised List of Dec. 10, 1883.
Wm. Wilcox & Co. }
Norwich Lock Co. }
Yale Lock Mfg. Co.'s "Standard" .... dis 40 %
Eagle .... dis 25 %
Romer's .... dis 25@40 %
A. E. Dietz .... dis 35 %
"Star" .... dis 45 %
Fraim & Bro. List of 1883-84 .... dis 55&5 %
Barnes Mfg. Co. .... dis 40 %

Lustro.
Four-ounce bottles .... ₩ doz, $1.75; ₩ gro. $17.00 net

Mallets.
Hickory .... dis 10&10 %
Lignumvitæ .... dis 10&10 %
Penfield Block Co., Lignumvitæ and Hickory .. dis 30 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
₩ doz .. $14.00 17.00 19.00 30.00—dis 40 %
Miles' Challenge .... Nos. 1 2 3
₩ doz .. $22.00 30.00 40.00—dis 40 %
Perry's. Nos. 1 2 3 4 4 g'rd 5 g'rd
Each .... $3.00 4.00 5.00 11.00 13.00 36.00—dis 25&5 %
Woodruff's (P. S. & W.) .... Nos. 100 150
₩ doz. $15.00 18.00—dis 40 %
Hales' .... Nos. 11 12 13
₩ doz ... $27.00 33.00 45.00—dis 50&10&2 %
Draw Cut .. Nos. 5 2 6 8 10
Each .. $50.00 75.00 80.00 225.00 400.00—dis 20 %
American .... dis 25 %

Nos.	1	2	3	4	B
Each	$5.00	7.00	10.00	25.00	50.00

60.00
Enterprise .... dis 25 %

Nos.	10	12	22	2	
Each	$3.00	2.50	4.00	6.00	10.00

Kieser's No. 55 .... $40 ₩ doz, dis 40 %
Kieser's Gem .... $25 ₩ doz, dis 40 %
Kieser's Monarch .... $45 ₩ doz, dis 40 %
Kieser's Butcher .... $40 each, dis 20 %
Silver & Deming .... dis 25 %
Pennsylvania .... dis 40&10 %

Nos.	1	2	3	00
₩ doz.	$24.00	28.00	36.00	28.00

Beef Shavers (Enterprise Mfg. Co.) .... dis 20&10 %

Mincing Knives.
Am. (2d quality), ₩ gro, 1 blade, $7; 2 blades, $12; 3 blades, $18 .... Net
Lothrop's .... dis 20&10 %
Smith's, ₩ doz, Single, $2.25; Double, $3 .... dis 40&10 %
Cowles Hdw. Co. .... dis 55 %

Molasses Gates.
Stebbins' Patterns .... dis 70&10 %
Stebbins' Genuine .... dis 67½&10 %
Stebbins' Tinned Ends .... dis 40&10 %
Chase's Hard Metal .... dis 50&10 %
Bush's .... dis 20 %
Lincoln's Pattern .... dis 60&10 %
Weed's .... dis 15 %
Boss Nos. .. 1 2 3 4
$7.00 8.00 9.00 10.00 .. ₩ doz, dis 60&10&10 %

Nails .... See Trade Report
Wire Nails .... dis 35@40 %

Nail Puller.
Curtiss Hammer .... ₩ doz $9.00 net

Nuts and Washers.
In lots less than 100 lb, ℔ lb, add ½¢ to list; 1 lb boxes, 1¢ to list.
Square Nuts ... 8¾ off list
Hexagon ... 8¾ off list
Washers ... 8¾ off list

Nut Crackers.
Table (Humason & Beckley Mfg. Co.) ... dis 33⅓ %
Blake's Pattern ... ℔ doz $2.00, dis 5 %
Turner & Seymour Mfg. Co ... dis 50 %

Oakum.—Dis on 100 bales and over, ⅛ % ℔ lb.
Best ... ℔ lb 9 ¢
U. S. Navy ... ℔ lb 8 ¢
Navy ... ℔ lb 6¾¢

Oilers.
Zinc and Tin ... dis 60&10 %
Brass and Copper ... dis 50 %
Malleable (Hammer's), No 1, $3.25; No. 2, $3.60; No. 3, $4.00 ℔ doz ... Net
Prior's Patent or "Paragon" Zinc. dis 60&5 @ 60&10 %
Prior's Patent or "Paragon" Brass ... dis 50 %
Olmstead's Tin and Zinc ... dis 60 %
Olmstead's Brass and Copper ... dis 50 %
Broughton's Zinc ... dis 60 %
Broughton's Brass ... dis 50 %

Packing, Steam.
N. Y. Belting & Packing Co ... dis 20 %

Pencils.
Faber's Carpenters' ... high list, dis 50 %
Faber's Round Gilt ... ℔ gro $5.25 net
Dixon's Lead ... ℔ gro $4.50 net
Dixon's Lumber ... ℔ gro $6.75 net
Dixon's Carpenters' ... dis 40&10 %

Picks.
Railroad, 5 to 6, $11.00; 6 to 7, $12 ... dis 50 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13 ... dis 50 %

Picture Nails.
Brass Head, Sargent's list ... dis 50&10 %
Brass Head, T. & S. Mfg. Co ... dis 50 %
Porcelain Head, Sargent's list ... dis 50&10 %
Porcelain Head, Judd's list ... dis 33⅓ %
Porcelain Head, T. & S. Mfg. Co ... dis 33⅓ %
Niles' Patent ... dis 33⅓ %

Pinking Irons ... ℔ doz 75¢ net

Planes and Plane Irons.
Bench, First Quality ... dis 20 %
Bench, Second Quality ... dis 25 %
Molding ... dis 15 %
Bailey's (Stanley R. & L. Co.) ... dis 20&10 %
The Stanley (S. R. & L. Co.) ... dis 20&10 %
Bailey's "Victor" ... dis 20&10 %
Plane Irons, Butcher's ... $5.00 @ $5.25 to £
Plane Irons, Buck Bros ... $5.00 to £
Plane Irons, Auburn Tool Co ... dis 20&10 %
Plane Irons, The Globe Mfg. Co., "Baldwin Iron" ... dis 20&10 %
L. & I. J. White ... dis 20 %
Plane Irons, Ohio Tool Co ... dis 20&10 %
Plane Irons, Sandusky Tool Co ... dis 20&10 %

Pliers and Nippers.
Button's Patent ... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $13.50; No. 4, 7 in., $21.00 ℔ doz ... dis 20&10 %
Humason & Beckley Mfg. Co ... dis 30&10 %
Gas Pliers ... dis 55 %
Eureka Pliers and Nippers ... dis 40 %
Russell's Parallel ... dis 25 %
P. S. & W. Cast Steel ... dis 33⅓&10 %
P. S. & W. Tinners' Cutting Nippers ... add 6 % dis 10 %

Plumbs and Levels.
Disston's ... dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable ... dis 65&10 %
Stanley R. & L. Co.' Non-Adjustable ... dis 65&10 %
Chapin's Patent Adjustable ... dis 65&10&10 %
Chapin's Non-Adjustable ... dis 65&10&10 %
Standard Rule Co.'s New Adjustable ... dis 65&10 %
Standard Rule Co.'s Non-Adjustable ... dis 65&10 %
Johnson's Patent Adjustable ... dis 65&10 %
Pocket Levels ... dis 65&10 %
Davis' Inclinometers ... dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger ... ℔ doz $37.50, dis 20 %
Fletcher Post Hole Augers ... ℔ doz $36.00, dis 20 %
Eureka Diggers ℔ doz $27 ... Net
Leed's each $2.50 ... Net
Vaughan's Hollow Tube Post Hole— 6 in., $23.60; 7, 8 and 9 in., $25.00 ℔ doz, dis 20&10 %

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw, ℔ doz $19.00 ... dis 20 %
Disston's Pruning Hook ... ℔ doz $12.50, dis 20 %
E. S. Lee & Co.'s Pruner ... dis 33⅓ %
Pruning Shears ... ℔ doz $4.00 @ $4.50
Henry's Pruning Shears ... ℔ doz $5.50 @ $5.75 net
Wheeler, M. & Co.'s Combination ... ℔ doz $12, dis 20 %
Dunlap's Saw and Chisel ... ℔ doz $9, dis 40 %

Pulleys.
Hot House and Tackle ... dis 65&10 %
Japanned Screw ... dis 65&10 %
Brass Screw ... dis 70&10 %
Japanned Side ... dis 65&10 %
Japanned Clothes Line ... dis 60&10 %
Hay Fork, Solid Eye ... $4.50; Swivel, $5.00, dis 50&10 %
Hay Fork, "Anti Friction" ... $6.75, dis 10&10 %
Hay Fork, "F" Common and Pat. Bushed ... dis 20 %
Hay Fork, Tarbox Pat. Iron ... dis 20 %
Shade Rack ... dis 45 %

Pumps.—Cistern ... dis 40 %
Pitcher Spout ... dis 50 %
Yard and Set Length ... dis 40 %

Punches.
Saddlers' or Drive ... ℔ doz $2.00; 2.25; 2.50 ... dis 55 %
Bemis & Call Co.'s Cast Steel Drive ... dis 50&5 %
Bemis & Call Co.'s Springfield Socket ... dis 50&5 %
Spring ... ℔ doz $7.00, dis 55& 5 %
Spring, Leach's Patent ... dis 15 %
Bemis & Call Co.'s Spring and Check ... dis 40 %
Solid Tinners' ... ℔ doz $1.44, dis 40&10 %

Rail.
Sliding Door, Wrought Brass ... ℔ lb 35¢, dis 20 %
Sliding Door, Bronzed Wrt. Iron ... ℔ foot 12¢, dis 35 %
Sliding Door Iron, Painted ... ℔ foot 4¢, dis 10&10 %

Barn Door ... Inch.	1¼	⅝	⅞	
Per 100 feet ...	$2.60	3.60	5.60	—dis 10 %

B. D. for N. E. Hangers—

	Small.	Med.	Large.	
Per 100 feet ...	$2.10	2.70	—	net

Terry's Wrought Iron, 5¢ ℔ foot ... net

Rakes.
Hay ... dis 40 %

Razors.
J. R. Torrey Razor Co ... dis 20 %
Wostenholme & Butcher ... $10 to £, dis 10

Razor Strops.
Genuine Emerson ... dis 45@50 %
Badger's (not Emerson) ... dis 33⅓ %
Imitation Emerson ... ℔ doz $2.00, dis 20&10 %
Torrey's ... dis 20 %

Refrigerators.
G. N. Pierce & Co ... dis 30 @ 33⅓ %
Challenge ... dis 33⅓ %
Challenge Beer Coolers ... dis 25 %

Rivets.
Black Iron and Tinned ... dis 40 %
Iron in bulk ... dis 40 %
Iron Carriage Rivets ... dis 40 %
Tinned Iron Rivets and Burrs ... dis 40 %
Copper Rivets and Burrs ... dis 50 %

Nos.	7	8	9	10	11	12	13	14	15
℔ lb	49¢	50¢	52¢	54¢	56¢	58¢	60¢	65¢	70¢

Rivet Sets ... dis 40&10 %

Rods.—Stair, Brass ... dis 25 %
Stair, Black Walnut ... 60¢ ℔ doz, dis 10 %

Rollers.—Barn Door, Sargent's list ... dis 60&10&10 %
Acme (Anti-Friction) ... dis 55 %

Rope.—Mnf's list, May 14, 1884 ... dis 1¢ ℔ lb
Manila ... ⅝ inch and larger ℔ lb 14 ¢
Manila ... ⅜ inch ℔ lb 14½¢
Manila ... ¼ and 5-16 inch ℔ lb 15 ¢
Manila Tarred Rope ... ℔ lb 13½¢
Manila, Fine Tarred Lath Yarn ... ℔ lb 14½¢
Manila, Hay Rope ... ℔ lb 14 ¢
Sisal ... ½ inch and larger ℔ lb 9½¢
Sisal ... ⅜ inch ℔ lb 10 ¢
Sisal ... ¼ and 5-16 inch ℔ lb 10½¢
Sisal, Hay Rope ... ℔ lb 9½¢

Rules.
Boxwood ... dis 70&10 @ 75&5 %
Standard ... Ivory ... dis 55&10 %
Stanley ... Ivory ... dis 50&10 %
Stephens ... Ivory ... dis 55 %

Sad Irons.
From 4 to 10 ... ℔ 100 lb $2.70 @ $2.75
Self-Heating ... ℔ doz. $9.00 net
Self-Heating, Tailors' ... ℔ doz. $18.00 net
Gleason's Shield and Toilet ... dis 25 %
Mrs. Pott's Irons, Double Pointed ... dis 35 %
Mrs. Pott's Irons, Square Back ... dis 35 %
Enterprise Star Irons, new list, July 20, 1882 ... dis 35 %
Combined Fluter and Sad Iron ... ℔ doz. $15.00, dis 15 %
Chinese Laundry (N. E. Butt Co.) ... 8½¢, dis 15 %
New England ... 5¢, dis 15 %

Sand Paper and Emery Paper.
Baeder & Adamson's Flint, 00 to 1½ ... $4.50 ℔ ream
Baeder & Adamson's Flint, 2, 2½ & 3 ... 5.00 ℔ ream
Baeder & Adamson's Flint, assorted. 4.75 ℔ ream
Baeder & Adamson's Star ... 3.75 ℔ ream
Baeder & Adamson's Emery ... ℔ ream 6.50 @ 11.50
(dis 35 %)
Bartles Best Flint, Nos. 00 to 1½ ... ℔ ream $4.50
Bartles Best Flint, assorted ... ℔ ream 4.50
Bartles Best Flint, Nos. 2 to 3 ... ℔ ream 5.00
Bartles Best Flint, No. 3½ ... ℔ ream 5.50
Columbia Flint, all Nos ... ℔ ream 4.00
Madison Mills Flint, all Nos ... ℔ ream 3.50
(dis 35 %)
Bartles Emery Paper ... ℔ ream $6.50 @ 11.00
Bartles Emery Cloth ... ℔ ream 18.00 @ 26.00
Crocus Cloth ... ℔ ream 18.00 @ ...
(dis 35 %)
New England, same list as B. & A. Flint ... dis 30&10 %
Gage's ... dis 30&10 %

Sash Cord.
Common ... ℔ lb, 12½¢ @ 13¢ net
Patent ... ℔ lb, 15¢ @ 16¢ net
White Cotton Braided ... 32½¢ @ 34¢ ℔ lb net
Silver Lake, Hemp ... ℔ lb 50¢, dis 10&10 %
Silver Lake, White Cotton ... ℔ lb 50¢, dis 10&10 %
Silver Lake, Drab Cotton ... ℔ lb 55¢, dis 10&10 %
Spring Lake ... dis 10&10&5 %
Raw Hide, ℔ foot, 1¼ in. 5¢; 5-16 in., 7¢; ⅜ in., 10¢ ... dis 15 %

Sash Locks.
Clark's No. 1, $10.00; No. 2, $8.00 ℔ gross ... dis 33⅓ %
Ferguson's ... dis 33⅓ %
Morris ... dis 50 %
Broughton's Burglar Proof ... dis 33⅓ %
Walker's ... dis 10 %
Attwell Mfg. Co ... dis 25@33⅓ %
Hammond's Window Springs ... dis 25 %
Northup Window Springs, No. 1, $10.00 ℔ gross ... dis 15 %

"Common Sense," Japanned, Coppered and Bronzed ... ℔ gross $5.00 net
"Common Sense," Nickel Plated ... ℔ gross $12.00 net
"Universal" ... dis 30 %
Kempshall's Gravity ... dis 50 %
Kempshall's Model ... dis 50&10 %
Corbin's Daisy ... dis 50&10 %
Payson's Perfect ... dis 50 %
Hugunin's "New" and "Improved Screw" Balances:
Malleable Iron, February, 1884, list ... dis 33⅓ %
Gray Iron, February, 1884, list ... dis 33⅓&15 %
Hugunin's Sash Locks, May, 1884, list ... dis 33⅓ %

Sash Weights.
Solid Eyes, in 500 lb lots and over ... ℔ lb 1¾¢ net

Sausage Stuffers or Fillers.
Miles' "Challenge" ... ℔ doz. $20, dis 40 %
Perry ... ℔ doz. No. 15; No. 0, $21, dis 25&10 %
Draw Cut No. 4 ... each, $30.00, dis 20 %
Enterprise Mfg. Co ... dis 25 %
Silver's ... dis 25 %

Saws.
Disston's Circular, Mill and Cross Cut ... dis 40 %
Disston's Hand, Panel, Rip, &c ... dis 20 %
Boynton's Lightning Cross Cuts, new list ... dis 40 %
Boynton's Circular and Mill ... dis 40 %
Boynton's Ice ... dis 25 %
Boynton's Lightning Hand, Panel and Rip ... dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand ... dis 30 %
W. M. & C. Champion X Cuts, Regular ... ℔ foot 29¢
W. M. & C. X Cuts, Thin Back ... ℔ foot 32½¢
Livingston's Butcher and Kitchen ... dis 20 %
Livingston's Framed Wood—

Nos.	101	102	103	104	105	
Per doz.	$10.00	8.50	10.00	7.50	6.20	net

Simond's Circular ... dis 35 %
Simond's Crescent-Ground Cross Cuts, patent December 26, 1882 ... dis 25 %
Peace Circular and Mill ... dis 40 %
Peace Hand, Panel and Rip ... dis 25 %
Peace Cross Cuts, Regular ... ℔ foot 29¢
Peace Cross Cuts, Thin Back ... ℔ foot 32½¢
Peace Band Saws, all widths ... dis 10 %
Richardson's Circular ... dis 40 %
Richardson's Mill and X Cut ... dis 40 %
Richardson's Hand Panel, Butcher and Web Saws ... dis 25 %
Barry's Circular ... dis 45 %

Saw Frames.
White, Vermont ... ℔ doz $1.50, dis 25&10 %
Red, Polished and Varnished ... ℔ doz $1.50, dis 10 %
Saw Rods ... $10 list, dis 10&10 %

Saw Sets.
Boynton's Patent X Cut, ℔ doz $12.00; Hand Saw, ℔ doz $10.00 ... dis 25 %
Stillman's Genuine ... ℔ doz $3.50 and $5.50, dis 10 %
Stillman's Imitation ... ℔ doz $3.25, dis 30&10 %
Common Lever ... ℔ doz $2.00, dis 30&10 %
Leach's ... No. 0, $8.00; No. 1, $15.00, dis 15 %
Nash's ... dis 20&10 %
Hammer, Hotchkiss ... $5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent ... dis 30&5 %
Bemis & Call Co.'s Lever and Spring Hammer ... dis 30&5 %
Bemis & Call Co.'s Plate ... dis 10 %
Bemis & Call Co.'s Cross Cut ... dis 12½ %
Aiken's Genuine ... $13.00, dis 50&10 %
Aiken's Imitation ... $8.00, dis 55 %
Hart's Patent Lever ... dis 20 %
Disston's ... dis 20 %
Morrill's ... No. 1, $15.00; No. 5, $52.00, dis 40&5 %
Croissant (Keller) ... No. 1, $15.00; No. 2, $24.00, dis 40 %

Scales.
Hatch, Counter, No. 171 ... ℔ doz $42.00, dis 40&10 %
Hatch, Tea, No. 161 ... ℔ doz $15.00, dis 40&10 %
Union Platform ... $6.00, dis 55 %
Fairbanks' ... dis 30&5 %
Riehlé Bros ... dis 33⅓ %
Buffalo Scale Co ... dis 33⅓ %
Forsyth Scale Co ... dis 33⅓ %
New York Standard Scale Co ... dis 45 %
Howe's ... dis 33⅓ %
Chatillon's Grocers' ... dis 40 %
Chatillon's Eureka ... dis 25 %
Chatillon's Family Favorite ... dis 30 %
Family Universal, ℔ doz, 12 lb, $30.00; 24 lb, $36.00, net
Family, Turnbull's ... dis 30 %
Scale Beams, List of January 12, 1882 ... dis 45&10 %
Scale Beams, Custer ... dis 25 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.) $6.50, dis 20&10 %
Box, 1 Handle ... ℔ doz $4.00, dis 10 %
Box, 2 Handle ... ℔ doz $6.00, dis 10 %
Defiance Box and Ship ... dis 20&10 %
Foot ... dis 50&10 %
Ship, Common ... ℔ doz $3.50 net
Ship, Providence Tool Co ... dis 10 %

Screen Corners.
Porter's Pat. Window and Door Frame ... dis 33⅓ %

Screw Drivers.
Douglas Mfg Co ... dis 20&10&10 %
Disston's ... dis 40 %
Disston's Patent Excelsior ... dis 40 %
Buck Bros ... dis 27½ %
Stanley R. & L. Co.'s Varnished Handles ... dis 60&10 %
Stanley R. & L. Co.'s Black Handles ... dis 50&10 %
Sargent & Co.'s Nos. 1 & 20, Forged Blade ... dis 66⅔&10 %
Sargent & Co.'s Nos. 20 & 30, Cast Steel ... dis 55&10 %
Sargent & Co.'s No. 60, Round Blade ... dis 60&10 %
Gay's Double Action Ratchet ... dis 35 %
Sets Interchangeable ... ℔ doz $18.00, dis 25 %
Champion ... dis 25 %
Clark's Patent ... dis 20&10 %

Screws.
Flat Head Iron ... dis 70&10@75 %
Round Head Iron ... dis 65&10@70 %
Flat Head Brass ... dis 70&10@75 %
Round Head Brass ... dis 60&10@65 %
Brass and Silver Capped ... dis 40 %
Japanned, list of Plain Screws ... dis 60 %
Coach, Patent Gimlet Point ... dis 75&5 %
Bed ... dis 33⅓ %
Machine, Flat Head, Iron ... dis 55 %
Machine, Round Head, Iron ... dis 50 %
Bench, Iron ... dis 55&10 %
Bench, Wood, Beech ... ℔ doz $3.00, dis 10 %
Bench, Wood, Hickory ... dis 20&10 %
Hand, Wood ... dis 25&10 %
Hand Rail, Sargent's ... dis 66⅔&10 %
Hand Rail, Humason, Beckley & Co.'s ... dis 66⅔&10 %
Hand Rail, Am. Screw Co ... dis 70 %
Jack (Wilson's) ... dis — %

Scroll Saws.
Lester, $10.00 ... dis 25 %
Rogers, $3.50 ... dis 25 %

Scythes ... dis 25 %

Shears and Scissors.
American (Cast) Iron ... dis 70&10 %
Pruning ... See Pruning Hooks and Shears
Barnard's Lamp Trimmers ... ℔ doz $3.75
Tinners' ... add 6 %, dis 10 %
Seymour's, List, Dec., 1881 ... dis 60 %
Heinsch's, List, Dec., 1881 ... dis 60 %
Heinsch's Tailor's Shears ... dis 33⅓ %
Mass. Cutlery Co. St. Trimmers ... dis 75 %
Cast Steel Trimmers ... dis 80 %
Wiss, J., & Sons' list, Dec., 1881 ... dis 60 %
Wiss, J., & Sons' Tailors' Shears ... dis 50 %

Sheaves.
Sliding Door, M. W. & Co., list ... dis 50&10&2 %
Sliding Door, R. & E., list ... dis 60&10&2 %
Sliding Door, Patent Roller ... dis 60&10&2 %
Sliding Door, Patent Roller, Hatfield's ... dis 60&10&2 %
Sliding Door, Russell's Anti-Friction ... dis 60&10&2 %
Sliding Door, Moore's Anti-Friction ... dis 60 %
Sliding Shutter, R. & E. list ... dis 50&10&2 %
Sliding Shutter, Sargent's list ... dis 60&10 %
Sliding Shutter, Reading list ... dis 60&10 %
Moore's Anti-Friction (Hanging) ... New list, dis 25 %

Ship Tools.
L. & I. J. White ... dis 20&5 %

Shovels and Spades.
Ames' Shovels, Spades and Scoops ... dis 17½ %
Griffiths' ... dis 50&10 %
Old Colony ... dis 15 %
Groom Shovel Co ... dis 20 %
Hussey, Binns & Co ... dis 20 %
Lehigh Mfg. Co ... dis 50&10 %
Payne Pettebone & Son, list Jan. 2, 1882 ... dis 50&5 %
R. T. Pettebone, Pat. Shovels, new list ... dis 50 %
R. T. Pettebone, Pat. Scoops, new list ... dis 20 %
Remington's (Lowman's Patent) ... dis 30 %
Rowland's ... dis 50&10 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list ... dis 60&10&2 %
Iron and Brass Head, P. S. & W ... dis 50&5&10 %
Polished Steel, new list ... dis 50&10&2 %

Slates.
Square Frames, by case ... dis %
Less than a case ... dis %

Spoke Shaves.
Defiance Metallic ... dis 20&10 %
Iron ... dis 45 %
Wood ... dis 30 %
Bailey's (Stanley R. & L. Co.), new list ... dis 30&10 %
Stearns' ... dis 30&10 %

Spoke Trimmers.
Bonney's ... ℔ doz $10.00, dis 40&5 %
Stearns' ... ℔ doz $9.00, dis 20&10 %
Ives' ... No. 1, $15.00; No. 2, $12.00 ℔ doz, dis 55&10 %
Douglass' ... ℔ doz $9.00, dis 15 %

Spoons.
Basting ... dis 70&5 %
Solid Table and Tea ... dis 70 %
Britannia ... dis 60&10 %
Meriden Brit. Co., Rogers ... dis 50&5 %
Wm. Rogers Mfg. Co ... dis 50&5&5 %
Holmes, Booth & Haydens ... dis 50&10 %
Holmes & Edwards Silver Co ... dis 50&10&5 %
German Silver ... dis 40&5 %
Cast Steel, Silver Plated ... dis 33⅓ %
Tin (P. S. & W.), Teas ... $1.25 ℔ gro net
Tin (P. S. & W.), Tables ... $2.00 ℔ gro net
Tin (Cowles Hdw. Co) ... dis 10 %
Tin (Cowles Hdw. Co.), case lots ... dis 20 %

Squares.
Steel and Iron ... dis 50&10&2 % } Full cases,
Nickel Plated ... dis 50&10&2 % } extra 10 %
Try Square and T Bevels ... dis 55&10 %
Disston's Try Square and T Bevels ... dis 40 %
Winterbottom's Try and Miter ... dis 20&10 %

Stocks and Dies ... dis 5&10 %
"Lightning" Screw Plate ... dis 10 %

Stone.
Hindostan No. 1, 6¢; Ax, 8¢; Slips, 10¢ ... dis 40 %
Sand Stone ... ℔ lb, 5¢, dis 33⅓&10 %
Washita Stone ... No. 1, ℔ lb, 15¢ net
Washita Stone ... No. 2 ℔ lb, 11½¢ net
Washita Stone Slips ... No. 1, ℔ lb, 39¢ net
Arkansas Stone, No. 1, 4 to 6 in ... ℔ lb, $1.35, dis 10 %
Arkansas Stone, No. 1, 6 to 9 in ... ℔ lb, $2.00, dis 10 %
Turkey Oil Stone (Chase) ... 4 to 8 in., ℔ lb, 60¢, dis 10 %
Turkey Slips (Chase) ... $1.75 ℔ lb, dis 10 %
Lake Superior (Chase) ... ℔ lb, 16¢, dis 10 %
Lake Superior Slips (Chase) ... ℔ lb, 30¢, dis 10 %
Grindstones, Family, Loring's ... dis 10 %

Stove Polish.
Joseph Dixon's ... ℔ gro $6.00, dis 10 %
Gem ... ℔ gro $4.50, dis 10 %
Gold Medal ... ℔ gro $6.00, dis 25 %
"Mirror" ... ℔ gro $6.00, dis — %
Lustro ... ℔ gro $4.75 net
Ruby ... ℔ gro $3.75 net
Rising Sun ... ℔ gro $5.75 net
Dixon's Plumbago ... ℔ lb 8¢ net
Boynton's Noon Day, ℔ gro, No. 1, large, $5.50; No. 2, small, $3; No. 3, medium, $4.

Tacks, Brads, &c.
New List, Sept. 1, 1882.
(Extra 10 % on all.)
Tinned Swedes Tacks ... dis 30 %
Tinned American Tacks ... dis 30 %
Swedes Tacks, all kinds ... dis 30 %
American Cut Tacks ... dis 30 %
Copper Tacks and Nails ... dis 30 %
Swedes Hungarian Nails ... dis 35 %
Gimp and Lace Tacks ... dis 30 %
Gimp and Lace Tacks, Tinned ... dis 30 %
Finishing Nails ... dis 25 %
Trunk and Clout Nails ... dis 25 %
Common and Patent Brads ... dis 20 %
Basket Nails ... dis 20 %
Brush Tacks ... dis 20 %
Leathered Carpet Tacks ... dis 20 %
Cigar Box Nails ... dis 20 %
Chair Nails ... dis 20 %
Double-pointed Tacks ... dis 55 %

Tap Borers.
Common and Ring ... dis 20 %
Ives' Tap Borers ... Nos. 1, 2, 4—dis 15&10 %
Ives' Tap Borers ... Nos. 13, 14—dis 25&10 %
Enterprise Mfg. Co ... dis 20&10 %

Tapes, Measuring.
American ... dis 20&10 @ 25&10 %
Spring ... dis 40 %
Chesterman's ... Regular list dis 15 @ 20 %

Thermometers.
Tin Case ... dis 80 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion) ... dis 20&10 %
Wood Bottom ... ℔ doz $10.00, dis 25&10 %
All Iron ... ℔ doz $8.25, dis 35 %
Nashua Lock Co.'s ... ℔ doz $18.00 dis 50@55 %
Wilson's ... dis 50 %
Clipper (Sargent & Co.) ... ℔ doz $18, dis 20&10 %
Acme ... ℔ doz $20.00, dis 40 %

Tinners' Tools and Machines.
Machines (P. S. & W.) ... list add 20 % } dis 10 %
Tools (P. S. & W.) ... add 6 % }

Transom Lifters.
Wollensak's Patent ... dis 35 %
Reiher, Imp. Lifter, list, Oct., 1883 ... dis 35&5 %
Excelsior ... dis 50&10&2 %

Traps.
Game, Newhouse ... dis 35 %
Game, Oneida Pattern ... dis 60&10 %
Game, Blake's Patent ... dis 40&10 %
Mouse, Wood, Choker ... ℔ doz holes, 15¢
Mouse, Round Wire ... ℔ doz $1.50, dis 10 %
Mouse Cage, Wire ... ℔ doz $2.50, dis 10 %
Mouse Catch-'em-alive ... ℔ doz $2.50, dis 15 %
Mouse, "Bonanza" ... ℔ gross $10 net
Mouse, Delusion ... ℔ gross $18.00, dis 20 %
Rat, "Decoy" ... ℔ doz $10.00, dis 10 %

Trowels.
Lothrops' Brick and Plastering ... dis 25 %
Reed's Brick and Plastering ... dis 15 %
Disston's Brick and Plastering ... dis 20 %
Peace's Plastering ... dis 25 %
Clement & Maynard's ... dis 20 %
Rose's Brick ... dis 15 %
Brade's Brick ... dis 25 %
Worrall's Brick and Plastering ... dis 20 %
Garden ... dis 50 %

Triers.
Butter and Cheese ... dis 25 %

Truck, Warehouse, &c.
Penfield Block Co.'s list, 1882 ... dis 40 %

Vises.
Solid Box ... dis 50 %
Solid, Peter Wright's ... 15½¢
Solid, Wilkinson's ... 14@15¢
Parallel, Fisher & Morris Double Screw ... dis 15&10 %
Parallel, Stephens' ... dis 25 %
Parallel, Parker's ... dis 20 %
Parallel, Wilson's ... dis 50 %
Parallel, Howard's ... dis 40 %
Parallel, Bonney's ... dis 33⅓ %
Parallel, Merrill's ... dis 15@20 %
Parallel, Sargent's ... dis 60&10 %
Parallel, Backus and Union ... dis 40 %
Parallel, Double Screw Leg ... dis 15&10 %
Parallel, Prentiss ... dis 25 %
Parallel, Simpson's Adjustable ... dis 25&5 %
Saw Filers, Bonney's ... ℔ doz $20.00, dis 40 %
Saw Filers, Stearn's ... dis 20&10 %
Saw Filers Hopkins' ... ℔ doz $17.50, dis 10 %
Saw Filers, Reading ... dis 40&10 %
Saw Filers, Wentworth ... dis 20&10 %
Cowell Hand Vises ... dis 20 %
Richardson's Vise and Anvil ... dis 25 %

Washer Cutters.
Smith's Patent ... ℔ doz $12.00, dis 25 %
Johnson's ... ℔ doz $11.00, dis 33⅓ %
Penny's ... ℔ doz Pol. $14; Jap'd, $16 .. dis 55 %
Appleton's ... ℔ doz $16.00, dis 60&10 %

Washers.—See Nuts and Washers.

Well Wheels ... dis 60&10 %

Wire.
Brass and Copper, new list, Jan. 18, 1884 ... dis 20 %
Market, Bright and Annealed, Nos. 0 to 18 ... dis 65 %
Market, Coppered ... dis 60 %
Market, Galvanized ... dis 50 %
Market, Tinned, Tinned list ... dis 55 %
Stone, Bright and Annealed Nos. 19 to 26 ... dis 65&7½ %
Stone, Bright and Annealed Nos. 27 to 36 ... dis 70&10 %
Stone, Galvanized, Nos. 19 to 30 ... dis 50 %
Stone, Tinned, Tinned list ... dis 55 %
Tinned Broom Wire ... dis 60 %
Cast Steel Wire ... dis 50 %
Annealed Fence, Nos. 8 & 9 ... dis 65 %
Annealed Grape, Nos. 10 to 14 ... dis 65 %
Fence Staples ... ℔ lb 5@5¼¢
Fence Staples, Galvanized ... ℔ lb 6@6¼¢
Stubs' Steel Wire ... $6.00 to £, dis 30 %
Barb Fence ... See Trade Report
Iron Wire on Spools ... dis 35 @ 40 %
Steel Music Wire, Nos. 7 to 30 ... $1.00 ℔ lb
Picture Wire ... dis 40&10 %
Clothes Line Wire, Galvanized ... ℔ coil 25¢ @ 40¢ net
Wire Cloth, green, drab and black, ℔ 100 sq. ft. ... $2.00 @ $2.25 net

Wrenches.
American Adjustable ... dis 45 %
Baxter's Adjustable "S" ... dis 33⅓ %
Baxter's Diagonal ... dis 35&10 %
Coes' Genuine ... cash in 10 days, dis 60&3 %
Coes' "Mechanics'" ... dis 60&10&3 %
Coes' Pattern, Malleable ... dis 70&15 %
Coes' Pattern, Wrought ... dis 70&10&5 %
Girard Standard ... dis 60 %
Girard Agricultural ... dis 70&10 %
Bemis & Call's Patent Combination ... dis 30 %
Bemis & Call's Merrick's Pattern ... dis 35 %
Bemis & Call's Brigg's Pattern ... dis 25 %
Bemis & Call's Cylinder or Gas Pipe ... dis 40 %
Aiken's Pocket (Bright) ... $6.00, dis 50&10 %
The Favorite Pocket (Bright) ... ℔ doz $4.00, dis 40 %
Webster's Patent Combination ... dis 25 %
Agricultural Wrenches, Eberhard ... dis 33⅓ %
Boardman's ... dis 25 %

Wringers. (Net @ 10 %)

	Per doz.
Novelty Nos. 2 and 2½	$33.00
Novelty Nos. 3 and 3½	37.50
Universal, No. 2½	33.00
Universal, No. 2	34.50
Excelsior E	42.00
Excelsior F	46.50
Adams & Co. No. 8	33.00
Peerless No. 2½	33.00
Peerless No. 3½	37.50
Metropolitan No. 2½	33.00
Metropolitan No. 2	34.50
No. 99 Improved 2½	33.00

WHOLESALE METAL PRICES, June 4, 1884.

METALS.

IRON.—DUTY: Bars, 8-10¢ to 1 1-10¢ ℔ lb; provided that no Bar Iron shall pay a less rate of duty than 35 %. Sheet, 1 1-0¢ to 1 5-10¢ ℔ lb. Band, Hoop and Scroll, 1¢ to 1 4-10¢ ℔ lb. Railroad Bars weighing more than 25 lb ℔ yard, 7-10¢ of 1¢ ℔ lb.

American Iron.

Foundry No. 1	℔ ton	$20.00 @ 21.00
Foundry No. 2	℔ ton	19.00 @ 19.50
Gray Forge	℔ ton	17.50 @ 18.50

Scotch Iron.

Carnbroe	℔ ton	21.50 @ 22.00
Coltness	℔ ton	21.50 @ 22.00
Shotts	℔ ton	21.50 @ 22.00
Glengarnock	℔ ton	21.50 @ 22.00
Gartsherrie	℔ ton	21.25 @ 22.00
Langloan	℔ ton	..... @ 21.50
Summerlee	℔ ton	..... @ 21.00
Dalmellington	℔ ton	..... @ 20.00
Eglinton	℔ ton	..... @ 19.50
Clyde	℔ ton	..... @ 20.50

Rails.

Steel, at Eastern mills	℔ ton	32.00 @ 32.50
Old Rails, Ts	℔ ton	..... @ 19.00

Scrap.

Wrought, ℔ ton, from yard		21.00 @ 22.00

Bar Iron from Store.

Common Iron:		
¾ to 1 in. round and square / 1 to 6 in. x ⅜ to 1 in.	℔ lb	2 @ 2.10¢
Refined Iron:		
¾ to 2 in. round and square / 1 to 6 in. x ¾ to 1 in.	℔ lb	2.10 @ 2.25¢
1 to 6 in. x 1¼ and 5-16	℔ lb	2.30 @ 2.45¢
Rods—¾ and 11-16 round and sq.	℔ lb	2.20 @ 2.35¢
Bands—1 to 6x3-16 to No. 12	℔ lb	2.50 @ 2.60¢
"Burden's Best" Iron, base price	℔ lb	3¢
Burden's "H. B. & S." Iron, base price	℔ lb	2.6¢
Norway Nail Rods		5¼ @ 6¢

Sheet Iron.—From Store.

	Common American.	R. G. Cleaned.
Nos. 10 to 16	℔ lb 2.80 @ 3 ¢	4 ¢
17 to 20	℔ lb 3 @ 3.12½	4 ¢
21 to 24	℔ lb 3.25 @	4¼¢
25 and 26	℔ lb 3.50 @	4½¢
27	℔ lb 3⅝ @	4⅝¢
28	℔ lb 3¾ @ 4 ¢	4¾¢

	B. B.	2d qual.
Galvanized, 10 to 20	℔ lb 6¼¢	5¼¢
Galvanized, 21 to 24	℔ lb 6¾¢	5¾¢
Galvanized, 25 to 26	℔ lb 7¼¢	6¼¢
Galvanized, 27	℔ lb 7¾¢	6¾¢
Galvanized, 28	℔ lb 8¼¢	7¼¢
American Russia	℔ lb 10½¢	B, 9¼¢
Russia	℔ lb 12¢ @ 14¢	
American Cold Rolled B. B.	℔ lb 5¢ @ 7¢	

Iron Wire. *See Wire.*

STEEL.—DUTY: Ingots, Bars, Sheets, &c., valued at 4¢ ℔ lb or less, 45 % ad. val.; valued above 4¢ and not above 7¢ ℔ lb, 2¢ ℔ lb; valued above 7¢ and not above 10¢ ℔ lb, 2¼¢ ℔ lb; valued above 10¢ ℔ lb, 3¼¢ ℔ lb. *Extras.*—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1¼¢ ℔ lb in addition to above; Steel Circular Saw Plates, 1¢ ℔ lb in addition to the above.

American Cast Steel.

For American Steel, see Pittsburgh quotations.

English Steel.

Best Cast	℔ lb	15¼¢
Extra Cast	℔ lb	16¼ @ 17¼¢
Circular Saw Plates	℔ lb	41¢
Round Machinery, Cast	℔ lb	10½¢
Swaged, Cast	℔ lb	16½¢
Best Double Shear	℔ lb	15½¢
Blister, 1st quality	℔ lb	14 ¢
German Steel, Best	℔ lb	10 ¢
2d quality	℔ lb	9 ¢
3d quality	℔ lb	8 ¢
Sheet Cast Steel, 1st quality	℔ lb	15½¢
2d quality	℔ lb	14½¢
3d quality	℔ lb	12½¢

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1¢ ℔ lb; Bars, Block and Pigs free.

Banca	℔ lb	@ 21½¢
Straits	℔ lb 20	@ .....
English	℔ lb 20½	@ 21 ¢
Bar	℔ lb	@ 22 ¢

Charcoal Tin Plates.

I C 10x14 / I C 12x12 / I C 20x28, 112	225 sheets ℔ box	$5.62½ @ $6.50
I X 10x14 / I X 12x12	225 " "	7.00 @ 8.00
I X 14x20, 112	" "	7.00 @ 8.00
D C 12½x17, 100	" "	5.50 @ 5.75
D X 12½x17, 100	" "	6.75 @ 7.50
For each additional X add		@ 1.50

Coke Tin Plates.

	Best.	Ordinary.
I C 10x14 / I C 14x20	$5.50	$5.00 @ $5.25
I C 12x12	5.62½	5.25 @ 5.37½
I C 10x20, gutters, 225 sheets	8.25	7.75
I C 20x28, 112 sheets		10.75

Terne Plates.

	Prime Char.	2d. quality	Coke.
I C 14x20 M. F.	@ $7.37½		
I C 14x20 Tregoning, Old Process			$7.00
I C 20x28	"	"	14.50
I C 14x20	$5.25 @	$5 @ $5.12½	$4.87½ @ $5
I X 14x20	6.50 @ 6.75		
I C 20x28	10.50 @ 10.75	10.00 @ 10.25	9.75 @ 10.00
I X 20x28	13.50 @		
I C 20x20	13.50 @ ...		

Tin Boiler Plates.

IXX 14x26, 2 sheets for No. 7, 112 sheets		@ $13.50
IXX 14x28, 2 " " No. 8, "		@ 14.50
IXX 14x31, 2 " " No. 9, "		@ 16.00

COPPER.—DUTY: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ ℔ lb. Manufactured (including all articles of which Copper is a component of chief value), 35 % ad valorem.

Ingot, Lake	℔ lb	15¾¢ @ 16 ¢
Ingot, Baltimore	"	14¾¢ @ 14¾¢
Braziers' Copper, ordinary sizes, 16 oz. ℔ sq. ft. and over		@ 22 ¢
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz. ℔ sq. ft.	"	@ 24 ¢
Braziers' Copper, 10 oz. and 12 oz. ℔ sq. ft.	"	@ 27 ¢
Lighter than 10 oz. ℔ sq. ft.	"	@ 29 ¢
Circles less than 84 in. in diam.	"	@ 25 ¢
" 84 in. diam. and over	"	@ 28 ¢
Segment and Pattern Sheets	"	@ 25 ¢
Locomotive Fire-Box Sheets	"	@ 28 ¢
Sheathing Copper, over 12 oz. ℔ sq. ft.	"	@ 20 ¢
Bolt Copper	"	@ 23 ¢
Copper Bottoms, 14x48	"	@ 22 ¢
Tinned Sheathing, 14x28, 14, 16, 18 oz.	"	@ 23 ¢
Tinned Sheathing, Planished, 14 x48, 14, 16 oz.	"	@ 31 ¢
Tinned Sheathing, Planished for boilers, 7, 8, 9 oz.	"	@ 33 ¢
Nickel-Plated Sheathing	"	@ 35 ¢
" " for boilers	"	@ 37 ¢
Plating extra	" 25 ¢	@ 37 ¢
Flat Copper Boiler Bottoms or Pit Bottoms, cut to special sizes	"	@ 23 ¢

Tinning.

14x48, by the case	℔ sheet, 8¢
14x8, less than case	" 8¼¢

For tinning both sides, double the above amount.

O'Neill's Patent Planished Copper.—Net.

14x48	
12 and 16 oz. and heavier	35¢ By the case. ℔ lb 34¢
12 oz. and lighter	38¢ " " " 37¢

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60.

14 and 16 oz. and heavier	37¢ By the case. ℔ lb 35¢
(And all sizes not over 20 in. wide.)	
14 and 16 oz. and heavier	℔ lb 39¢
12 oz.	" 42¢

Copper Wire.—*(See Wire.)*

Sheathing Metal.

Yellow Sheathing Metal, ℔ lb	....20 @ ...

BRASS AND GERMAN SILVER.

Brown & Sharpe's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1884. ..... dis. 20 %

LEAD.—DUTY: Pig, $2 ℔ 100 lb; Old Lead, 2¢ ℔ lb; Pipe and Sheet, 3¢ ℔ lb.

American	4½ @ 4¼¢
Bar	5¢
Pipe	6¼¢, dis 20 %
Tin Lined Pipe	15¢, dis 20 %
Sheet	7¼¢, dis 20 %
Shot	Drop, 6¼¢; Buck, 7¼¢
Chilled Shot	7¼¢

NICKEL.

Metallic, in grains	℔ lb	$1 00 ... ..
Metallic Anodes	℔ lb	$1.20 @ $1.25

Nickel-Plating Materials.

Composition, Cutting	℔ lb	$0.07
Composition, Cutting in bbls	"	.05
Composition, Emery Cake	"	.07
Composition, White Tripoli	"	.10
Sulphate and Ammonia	"	.40
Nickel, Chloride	"	1.00
Nickel, Chloride and Ammonia	"	.65
Acid, Muriatic, 20°	"	.04
Acid, Nitric, 38°	"	.10
Acid, Sulphuric, 66°	"	.04
Rouge, hard and soft, for Nickel	"	.30
Ammonia Water, 26° U. S. P.	"	.14
Potassa Caustic, pure white	"	.60

ANTIMONY.

Hallett's	℔ lb	11 @ 11¼¢
Cookson	"	12 @ 12¼¢

SPELTER—Duty: Pigs, Bars and Plates, $1.50 ℔ 100 lbs.

American, cash		4⅞¢ @ 5¼¢

ZINC—Duty: Pig or Block, $1.50 ℔ 100 lbs. Sheet, 2½¢ ℔ lb.

600 lb casks		.5¾ @ 5⅞ ℔ lb.
Zinc.—Open		6¼ @ 6¾¢
Zinc Tubing		dis. 10 @ 20 %

Zinc Tubing—Dis. 25 %.

Plain	.27
Fancy	.33
Scotch and Extra Patterns	.36

BABBITT METAL.

N. P. U.	℔ lb	7¼¢

A, 25¢; B, 23¢; C, 14¢.

WIRE.

Iron Wire.—Put up in 63 lb bundles.

Nos.	00 to 9,	10,	11,	12,	13, 14,	15, 16,	17,	18.
		10	11	11½	12½	14	15	16
Bright Market Wire					dis 60	@	62½ %	
" Charcoal					dis 45	@	47½ %	
" Bale Wire, Nos. 7 to 12					dis 55	@	57½ %	
Annealed Market Wire								
" Fence Wire, Nos. 8 and 9					dis. 60	@	62½ %	
" Grape Wire, Nos. 10 to 14								
" Bessemer Steel Wire					dis. 52½	@	57½ %	
Coppered Market Wire					dis. 55	@	57½ %	
" Bale Wire, Nos. 7 to 12					dis. 52½	@	57½ %	
Galvanized Market Wire					dis. 45	@	50 %	
" Fence Wire								

Stone or Weaving Wire.

Nos.	16	17	18	19	20	21	22	23	24	25	26
Cents	14	15	16	19	20	21	22	23	24	25	26
Nos.	27	28	29	30	31	32	33	34	35	36	..
Cents	28	29	30	32	33	35	37	40	45	55	..

Nos. 16 to 18	dis. 60	@ 62½ %
19 to 26	" 62½	@ 67½ %
27 to 36	" 65	@ 70 %
Galvanized Stone Wire	" 45	@ 50 %

Steel Wire.

Cast Steel, Stee Wire list	dis. 50 %

Brass and Copper Wire.

Old English Gauge the Standard.—Dis 20.

	Common High Brass	Low Brass	Gilding Bronze and Copper.
All Nos. to No. 16, inclusive	$0.22	$0.26	$0.30
No. 17 and 18	.23	.27	.31
" 19 and 20	.24	.28	.32
" 21	.25	.29	.33
" 22	.26	.30	.34
" 23	.28	.32	.36
" 24	.30	.34	.38
" 25	.32	.36	.40
" 26	.35	.39	.43
" 27	.38	.42	.46
" 28	.42	.46	.51
" 29	.45	.49	.54
" 30	.48	.52	.62
" 31	.51	.55	.67
" 32	.55	.59	.73
" 33	.59	.63	.82
" 34	.64	.68	.95
" 35	.70	.74	1.30
" 36	.76	.80	1.50
" 37	1.00	1.04	1.79
" 38	1.30	1.34	2.00
" 39	2.00	2.00	3.25
" 40	2.60	2.60	5.75

Spring Wire, 2 cents per pound advance. Whitened Wire, 3 cents per pound advance. Flat, Square and Half-Round Wire, 4 cents advance on Round Wire. Fancy Wire, not less than 10 cents advance on Round Wire. Spooling on one-pound Spools, 12 cents per pound extra. Spooling on ten-pound Spools or more, 2 cents per pound extra.

MISCELLANEOUS TINNERS' STOCK.

Solder.

½ & ⅓, Warranted	13½¢
Extra	12 ¢
No. 1 Refined	11 ¢
No. 2 "	10½¢
Extra wiping	11 ¢

Rivets.

Iron and Tinned, new list, Dec. 10, 1881	dis. 40 %
In bulk, new list, Dec. 10, 1881	dis. 40 %
Copper Rivets and Burrs	dis. 45 @ 50 %

Nos.	7	8	9	10	11	12	13	14	15
℔ lb	49¢	50¢	52¢	54¢	56¢	58¢	60½	65¢	70¢

Stove Bolts.

American Screw Co.'s	dis. 60 %
R. B. & W.	dis. 50 %
R. & E. Mfg. Co	dis. 50 %

GLASS.

Prices current per box of 50 feet.

List, July 2, 1882.

Single.

Sizes.	1st.	2d.	3d	4th.
6 x 8 to 10 x 15	$13.50	$11.50	$10.75	$10.25
11 x 14 to 16 x 24	14.50	13.50	12.50	11.50
18 x 22 to 20 x 30	18.50	17.00	15.50	14.00
15 x 36 to 24 x 30	20.50	18.50	16.25	
26 x 28 to 24 x 36	22.00	20.00	17.50	
26 x 36 to 26 x 44	24.00	22.00	18.50	
26 x 46 to 30 x 50	26.00	24.00	20.50	
30 x 52 to 30 x 54	27.00	25.00	21.50	
30 x 56 to 34 x 56	29.00	27.00	24.00	
34 x 58 to 34 x 60	31.00	29.00	26.00	
36 x 60 to 40 x 60	35.00	31.00	29.00	

Double.

Sizes.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$17.50	$15.00	$14.00	$13.00
11 x 14 to 16 x 24	20.00	18.00	16.50	
18 x 22 to 20 x 30	24.00	22.00	20.00	
15 x 36 to 24 x 30	26.50	24.00	21.00	
26 x 28 to 24 x 36	29.00	26.00	23.00	
26 x 36 to 26 x 44	30.00	28.00	24.00	
26 x 46 to 30 x 50	33.00	31.00	27.00	
30 x 52 to 30 x 54	35.00	32.00	28.00	
30 x 56 to 34 x 56	37.00	34.00	30.00	
34 x 58 to 34 x 60	40.00	37.00	33.00	
36 x 60 to 40 x 60	43.00	40.00	37.00	

Sizes above—$15 per box extra for every 5 inches. An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the united 84 inches bracket.

Discount 75 and 5 to 75 and 10.

PAPER STOCK, &c.

(Dealers' Selling Prices.)

	Cents ℔ lb.
White Shirt Cuttings, No. 1	6¼ @ 6¾
" " No. 2	4½ @ 5
Mill Assorted Whites	5¼ @ 5½
Unbleached Muslins	5 @ 5¼
City Whites, No. 1	3¾ @ 4
New Canton Flannels	..... @ 4¾
New Seconds, light	3¼ @ 3¾
" dark	2¾ @ 3
No. 2 Whites	2½ @ 2¾
Cotton Canvas	4 @ 4¼
Linen Canvas No. 1	4½ @ 4¾
Seconds, City No. 1	1¾ @ 1¾
Seconds, City No. 2	1 @ 1¼
Colors, ℔ cwt.	50 @ 60
Manila Rope	2¾ @ 3
" Tarred	2½ @ 2¾
Gunny Bagging, No. 1	1¾ @ 2
" No. 2	1¼ @ 1¾
Kentucky Bagging	4 @ ...
Burlap Bagging, No. 1	1¾ @ 2
Tar Shakings	1¾ @ 2
Hemp Twine Stock	3½ @ 4
Hard White Shavings, No. 1	3¾ @ 4
Soft White Shavings, No. 1	2¾ @ 3
White Shavings, No. 2, Soft	2 @ 2¼
Mixed Shavings, part White	2 @ 2¼
Ledger and Writing	2¼ @ 2½
Solid Stock	1⅞ @ 2
Book Stock, No. 1, light	1 @ 1¼
Old Newspapers	1 @ 1¼
Pure Manilas	1¾ @ ...
Bogus Manilas and Hardwares	¾ @ 1
Commons, ℔ 100 lb	60 @ 70
Binders' Board Cuttings	¾ @ 1
Straw Board Cuttings, ℔ cwt.	70 @ 75

PAINTS, OILS, &c.

Paints.

Black, Lamp—Coach Painters'	℔ lb 22 @ 24¢
" " Ordinary	6¢
" Ivory Drop, fair	12 @ 15¢
" " best	23¢
Black Paint, in oil	kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best	40 @ 55¢
" " " in oil	45 @ 55¢
" Chinese dry	70¢
" Ultramarine	18 @ 30¢
Brown, Spanish	11½¢
" Van Dyke	10 @ 12¢
Green Chrome	15 @ 23¢
" " in oil	14 @ 18 @ 25¢
" Paris	good, 20¢; best, 25¢
" " in oil	good, 30¢; best, 35¢
Iron Paint, Bright Red	℔ lb 2½¢
" Brown	" 1½¢
" Purple	" 3¢
" Ground in oil, Bright Red	" 6½¢
" " " Red	" 5½¢
" " " Brown	" 5½¢
" " " Purple	" 5¢
Mineral Paints	2 @ 4¢
Orange Mineral	10¢
Red Lead, American	7¢
" Venetian (Eng.) dry	$1.65 @ $1.70
" " in oil	asst'd cans, 11¢; kegs, 8¢
" Indian Dry	9 @ 12¢
Rose Pink	10 @ 13¢
Sienna, American Raw, powdered	4¢
" Burnt, powdered	4½¢
" " in oil	10 @ 16 @ 20¢
" Raw	11 @ 15 @ 25¢
Umber, Burnt, powered	4 @ 8¢
" " in oil	9 @ 12 @ 16¢
" Raw, powdered	3½ @ 7½¢
" " in oil	10 @ 16 @ 48¢
Vermilion, Chinese	90¢
" English	46 @ 48¢
" American, Common	15¢
White Lead, American, pure dry	6¼ @ 6¾¢
" " " in oil	6¼ @ 6¾¢
White Paris, English Prime	2 @ 2½¢
Yellow Ochre, French	$1.75
" " in oil	asst'd cans, 11¢; kegs, 8¢
" " Vermont	in cans, 1½¢
Yellow Chrome	17 @ 27¢
" " in oil	14 @ 18 @ 25¢
Zinc White, Amercan No. 1, dry	5 @ 6¢
" " No. 1, in oil	9¢
" French (Paris Dry)	6 @ 8¢
" " in oil	10 @ 11¢

Oils.

Linseed, Raw, in casks and bbls	57 @ 58¢
" Boiled, " "	60 @ 61¢
" Calcutta	58 @ 59¢
Bleached Whale, ℔ gal.	68¢
" Sperm	$1.13
" Elephant	75¢
Signal	72¢
Prime Lard	66¢
No. 1 Extra	60¢
West Virginia	9 @ 15¢
Drilling	40¢
Miners' Oil	43 @ 48¢
Fish Oil, Pressed	42 @ 45¢
Neatsfoot	63 @ 70¢
Tallow	63 @ 68¢
Empire Cylinder Oil	65¢
Machinery	40¢
Engine	50¢

Sundries.

Asphaltum, Cuban	6½ @ 9½
" Egyptian	9 @ 10¢
Benzine	℔ gal. 8 @ 10¢
Chalk	⅝¢
" Block	⅝¢
Dryers, Patent American	asst'd cans, 9¢; kegs, 7¢
Frostings	40c
Glue, White	24 ℔ 35¢
" Sheet	20¢
Glaziers' Points, Zinc	8¢
Gum, Copal	36¢
" Damar	25¢
" Shellac, English	40¢
" " dark	35¢
Litharge	7½c
Mineral Wool, ordinary, ℔ lb	1 @ 1½¢
" extra	3 @ 3½¢
Pumice Stone, selected Lumps	4 @ 6¢
" powdered	$2.75
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Pitch	$1.90
Putty, in bladders	3¢
" in bulk	2½¢
Rosin—Common and Good—Strained	$1.90
E & F	$2.10 @ $2.20
G & H	$2.30 @ $2.50
I & K	$2.60 @ $2.80
M & N	$3.00 @ $3.50
Spirits Turpentine, ℔ bbl	33 @ 34¢
Whiting, Spanish	1¼¢
Waste, No. 1 Cop	9½¢
Waste, No. 1 White Machine	9½¢
Waste, No. 2 White Machine	8¢
Waste, No. 1 Colored	7c
Waste, No. 2 Colored	6½¢
Waste, Washed Machine	9¢

HARDWARE NOVELTIES.

The Automatic Fruit Pail.

The illustration which we present herewith represents an article which is about to be put on the market by L. A. Sayre, 28 and 30 Orange street, Newark, N. J. This contrivance is designed to save time and labor in the picking of fruit. Its operation in a general way is indicated by the cut, the pail opening on the bottom when it comes in contact with the fruit already placed in the barrel. To accomplish this result the pail has a hinged bottom, which is fastened securely by the bolt operated by a treadle or lever on the outside of the bottom of the pail. After the fruit has been picked from the tree, the pail is lowered until it reaches its destination, when the treadle presses against the fruit already gathered, and, acting as a lever, draws the bolt, thus

Automatic Fruit Pail.

opening the bottom, so that when the pail is slowly raised the fruit is deposited without bruising. A slight pressure on the treadle is sufficient to unfasten the bolt, the pail being again very readily, by a simple motion, closed for the reception of another load. It will be perceived that the position of this treadle in the middle of the bottom gets it well out of the way of branches which might be the means of discharging its contents prematurely. The manufacturer adds that this article is not expensive, and will save its cost in a short time, but our readers will obtain information with reference to the prices in the review of the Hardware market.

Apple Parers.

The accompanying illustrations, Figs. 1 and 2, represent respectively the Waverly Apple Parer and the Jersey Apple Parer,

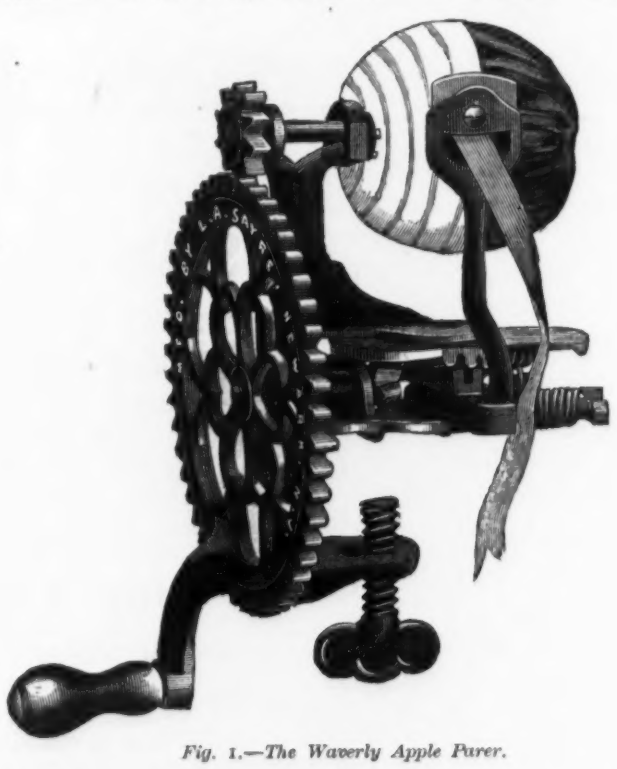


Fig. 1.—The Waverly Apple Parer.

Corer and Slicer, with push-off attachment, articles which are put on the market by L. A. Sayre, 28 and 30 Orange street, Newark, N. J. It will be perceived that the Waverly, Fig. 1, has all its gearing under the table of the machine, thus protecting it from the parings, which might cause it to clog. It is so construcued that it has a quick-return motion of the knife, paring the apple in four turns of the handle, including

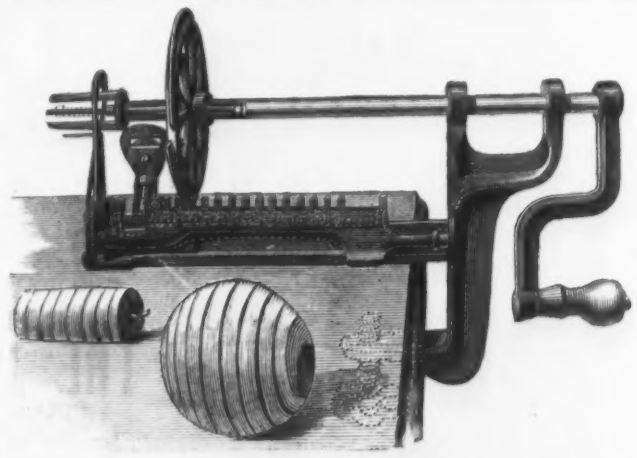


Fig. 2.—The Jersey Apple Parer.

one turn for the return of the knife in readiness for the next apple. Attention is called to the fact that the pinions with square holes are fitted on shaft with square ends, to prevent any possibility of their working loose. The manufacturer claims for this article superiority in the rapidity, effectiveness and simplicity of its action, and adds that it is especially adapted to factory use, as it pares close to the fork, leaving very little or no skin to remove by hand. It is compact and light, weighing 27 pounds per dozen. It is manufactured under patent dated January 29, 1884.

The Jersey Apple Parer, Corer and Slicer, represented in Fig. 2, has an automatic push-off for disposing of the core after the apple has been sliced. The point is made in its favor that, while paring the apple perfectly, it drops the parings clear of the machine and at the same time cores and slices the fruit. The rack is held in place by a spring catch, which is tripped by a guide-wheel after the apple is cored and sliced, when the shaft can be drawn back into position for another apple, at the same time expelling the core. By removing the slicing-knife this machine may be used as a plain parer. In alluding to the advantages of this machine the manufacturer mentions its strength in all its parts, its simplicity and non-liability to get out of order, adding that it is particularly adapted to the evaporating trade. Information with reference to the prices of these two parers may be found in our Trade columns.

New Spiral Screw-Driver.

The Decatur Coffin Company, of Decatur, Ill., are introducing a new spiral screw-driver, the general appearance of which, with the bit withdrawn, is shown in the engraving herewith. The rotary motion of this tool is obtained by two spiral grooves cut on the inside of the brass cylinder which forms the shank. A sleeve with corresponding spiral projections fits loosely upon the upper end of the bit and inside of the cylinder. On the lower edge of the sleeve

New Spiral Screw-Driver, Manufactured by the Decatur Coffin Co., Decatur, Ill.

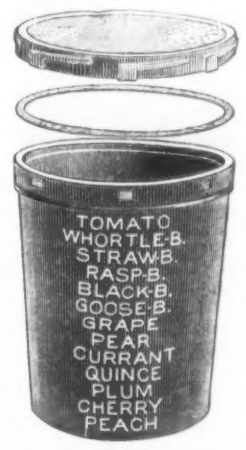
notches are cut, into which fits a pin that extends through the bit near the upper end. Whenever pressure is applied to the bit this pin engages in the notches in the sleeve, so that forcing the bit into the handle causes the bit to be rotated. Accordingly, by placing the end of the bit in the head of a screw and pushing the screw-driver against it the screw will be driven home. The manufacturers claim for this device simplicity of parts and thoroughness of construction. By providing the spiral groove in the shank of the tool the bit is left of full size, and therefore must be stronger than those of equal diameter which are cut away in order to obtain a construction which will impart a rotary motion under pressure. The sample which we have received, with the bit withdrawn, as shown in the engraving, is a little over 12 inches in length. When the bit is extended to its utmost capacity, it measures a trifle over 19 inches.

Self-Sealing Tin Can.

The accompanying illustrations show a very neat and simple tin fruit can, which can be

Fig. 2.—The Jersey Apple Parer.

instantly and perfectly hermetically sealed, and that, too, without wax or solder. It is known as Norton's Patent Self-Sealing Fruit Can, and is made by Norton Bros. and sold to the trade by Hibbard, Spencer, Bartlett & Co., of Chicago. It seems to meet the requirements of a first-class can for putting up fruit and vegetables for family use. The top, as shown in the first engraving, is provided with an exterior seamless flange having sectional screw threads on the outside of the can. The cover fits over this flange and is provided with corresponding indentations.



Norton's Patent Self-Sealing Fruit Can.—Fig. 1.—Can with the Lid Removed, Showing Paper Gasket.

It also has a groove in which is laid a paper gasket. This gasket is shown between the cover and body in Fig. 1, and consists of an annular strip of manila paper. In use the can is filled with hot fruit, the gasket put in place, the cover applied and turned slightly to the right, which presses the gasket between the two smooth surfaces and clamps it air-tight. This completes the work of putting up the fruit. A lug is soldered to the cover of one side, and a wrench for opening the cans of the kind shown in Fig. 3 accompanies each dozen. A special feature of these cans is the fact that, being tapering, they nest very compactly, and therefore a dozen can be put into very small space. They are put up in long, square pasteboard

Fig. 2.—Appearance of the Can When Sealed

boxes, and form very desirable stock, so far as space occupied is concerned. The body of each can is stamped with a list of the more common fruits that are put into such utensils, as shown in the engravings, which enables the housewife by any convenient means of marking to designate the contents of each can. The general appearance of the can, when sealed, is shown in Fig. 2. These cans have been thoroughly tested for two years past in the West, and have met with great favor in the trade. The workmanship on the cans we have examined is

Fig. 3.—Wrench for Opening.

excellent, and we feel sure our readers will be pleased with them on this account as well as others if samples are ordered.

The Buckeye Hose Reel and Sprinkler.

A convenient article for the lawn, the use of which is indicated in the above title and illustrated in the accompanying cut, is made by Mast, Foos & Co., Springfield, Ohio. The article shown in the illustration is ready to be attached by the hose to the water supply. When given an upright position it will be ready for operation as a sprinkler. Its convenience and utility are thus manifest. Two sizes are made—No. 2, carrying 100 feet of ¾-inch hose, and No. 4, carrying 200 feet of ¾-inch or 100 feet of 1-inch hose. This article is also made plain—that is, without the sprinkling attachment—in which case a T-handle is substituted for the sprinkler. The plain reel, as well as the combined reel and sprinkler, is made of two sizes—No. 1, medium size, carrying 100 feet of ¾-inch hose, and No. 3, large size, for carrying 200 feet of ¾-inch hose or 100 feet of 1-inch hose. In the combined hose reel and sprinkler the sprinkler can be detached and the handle screwed on in its place. The sprinkler tops can be had plain as regular or either nickel or silver plated, as desired. The reel and sprinkler standards are described as made of wrought iron, very strong and durable, finely finished and in all respects superior. The prices of the different sizes are given under the head of General Hardware.

The Buckeye Hose Reel and Sprinkler.

A Curious Bequest.—Since the announcement of the $400,000 bequest left by the late Wm. Maxwell, of Bridgeport, Conn., to Charles F. Ritchel to improve and experiment with his flying machine, letters from all over the world have been pouring in asking the Professor for information about the bequest and his balloon Some describe machines they have invented, and many ask for sums of money to perfect ideas of their own. Seven people have notified him within 10 days that they each contemplate leaving money to prosecute the experiments. These seven firmly believe that flying through the air will be accomplished successfully. One man writes that he has invented a flying machine on the "frog system." The machine is to give gigantic leaps of 500 yards and come down easily on an inclined-plane plan. Another proposes to reach the North Pole by strapping some other man to a balloon holding enough gas only to lift part of his weight, so that he could leap over an iceberg with perfect ease and go skipping along until the "pole" was caught. Another proposes to compress, say, 50,000 feet of gas into a small metal cylinder of 10 cubic feet capacity, and thus float away with the gas under his arm. Another, who signs himself as a seafaring man, writes that he has an invention that "will go against the wind," even against a hurricane. He is quite sure he can rise in the teeth of a Western cyclone, run his machine with a similar velocity to that of the wind, and come down just where he started from. Altogether 1765 letters have been received and 16 new-born flying-machine inventors have visited Bridgeport within the last 10 days. Some of the Professor's friends fear that perhaps the lawyers will get the fund, as already the heirs are beginning to question whether William Maxwell was in his right mind. Professor Ritchel will begin on a machine to raise a man 200 feet without gas or steering attachment. The power to work the machine will be compressed air carried to the machine through a hose.

The New England Iron Company's Suit.—The jury in the suit of the New England Iron Company to recover some $6,000,000 for breach of contract from the old Gilbert (now Metropolitan) Elevated Railway Company, of New York, disagreed on the 29th ult., after a trial of weeks in the Superior Court before Judge O'Gorman. The Iron Company alleged that they had made a contract in 1873 to construct the railroad for $735,000 a mile, and $23,000 additional for curves. This agreement was not carried out, and subsequently a contract was made with the New York Loan and Improvement Company, at $2,000,000 a mile, and then this company made a subcontract with the Edge Moor Iron Company for a part of the work, leaving the loan company, it is alleged, a profit of $305,000 a mile. The defense was that the New England Company were insolvent in 1873, and unable to fulfill their agreement.

Cantilever Bridge at Louisville.—A second bridge over the Ohio, between Louisville and New Albany, is an assured fact. The bridge is being built by the Delaware Bridge Company, of Trenton, N. J., of which Mr. Charles Macdonald is the head. Mr. Macdonald designed and built the famous cantilever bridge over Niagara Falls, completed this spring, and the Sand Island structure is to be built after the same plan. The bridge will be 2452 feet long, with two channel spans. The first of these will be over the canal, from between Thirty-second and Thirty-third streets to the lower end of Sand Island, and will be 483 feet in length. The other channel span, on the Indiana side, is to be 480 feet in length. The bridge will be 54 feet wide, and there will be two wagon tracks and two railroad tracks, besides a passageway for foot passengers on either side. The entire bridge, it is calculated, will cost $1,160,000. The two iron piers will cost $34,000, the stone $84,000, and the piers $124,000.

TRADE PUBLICATIONS.

Iron Fences.

We have received from the Hanika Iron Fence Company, of Springfield, Ohio, their catalogue "B," which has been recently issued. It is a neat oblong book of something over 120 pages, and is devoted to a display of the designs of wrought-iron fencing which they manufacture. At the outset a list of branch houses which have been established is given. From this we learn that agencies exist at Cleveland, Cambridge, Columbus, Delaware, Dayton, and Cincinnati, Ohio; Indianapolis, Ind.; Chicago, Ill.; Lexington, Ky.; Memphis, Nashville, and Chattanooga, Tenn.; Kansas City and St. Louis, Mo.; Atlanta, Ga.; Los Angelos, Cal., and Salt Lake City, Utah. The designs of fences presented cover a very wide range, from very plain fences composed of ½-inch round pickets up to the most elaborate fences that would be required about lawns and public buildings. In the specification of construction presented in the book we learn that the picket passes through each rail and extends below the bottom rail in all cases Special features of construction also give great strength to the rails that are used. These are rolled in channel and other forms well known for their strength. Other features to which the manufacturers direct attention are the manner of attaching the picket to the rail by means of a locking plate, the manner of attaching braces or short spaces between line posts, and the fact that, with a few exceptions, the fences have the same appearance on both sides. The picket points and ornaments are made of malleable iron. A number of designs of hitching posts are given; also fence gates Following the fence designs are illustrations of cemetery rail, stair rail in connection with iron steps, area and balcony railing, wrought-iron window guards, balcony and other brackets, crestings, finials, emblematic signs, lawn goods in rustic and other patterns, stable fixtures, and a general line of wire goods, embracing railings, guards, trellises, flower-stands, sieves, traps, screens, netting, &c.

The Silesian zinc works produced lats year 70.184 metric tons of spelter, and marketed 69.425 tons, against 69,146 and 62,165 tons respectively in 1882, thus showing that stocks have accumulated but little. In 1883, 449.206 tons of calamine and 124,807 tons of blende were mined, compared with 447,024 tons of the former and 120.30c tons of the latter in 1882. In 1883, however, only 395,227 tons of calamine and 124,807 tons of blende were marketed, as compared with 438.832 tons of calamine and 98,248 tons of blende in 1882.

The Nevada Bank of San Francisco is about to establish an agency in London.

Canadian Steel Works in Trouble.—A press telegram from London, Ontario, dated May 27, says that the sheriff's officers seized the goods and plant of the London Steel Works Company on the 24th ult., under writs issued at the instance of the Molsons Bank, the Ontario Rolling Mills and Ozias Shipman, amounting in all to about $4000. The property seized is valued at from $40,000 to $50,000.

Professor Rogers's paper on the perfect screw problem, the first portion of which we publish elsewhere in this issue, is peculiarly interesting, treating as it does of a subject of unquestionable importance, and which, while already referred to in our columns on previous occasions, can justly lay claim to further attention. We need scarcely remark that the problem presents difficulties requiring the utmost care and patience in their treatment—difficulties which, though in some cases apparently insignificant, are sufficiently far reaching in their effects to seriously modify the ultimate results. These different points have been carefully considered by Professor Rogers, and the account of the manner in which the work was done, the results obtained, and the nature of the various factors entering into the solution, will, no doubt, prove of value.

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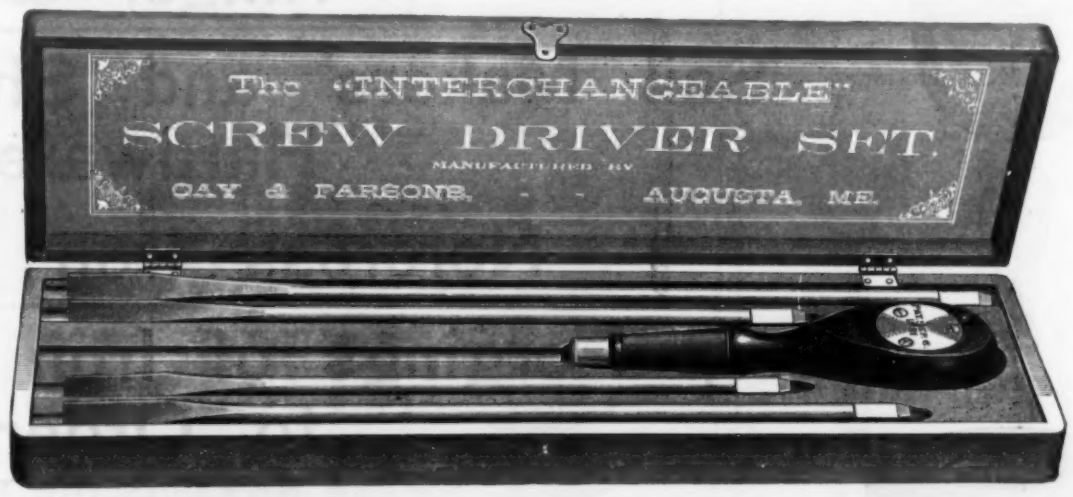

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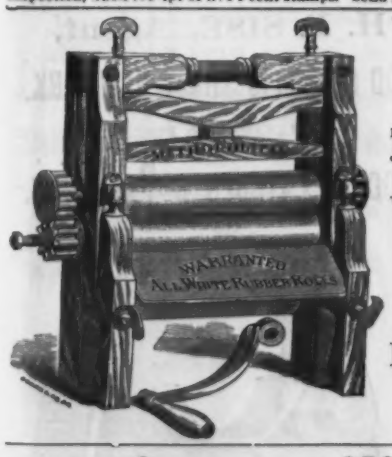

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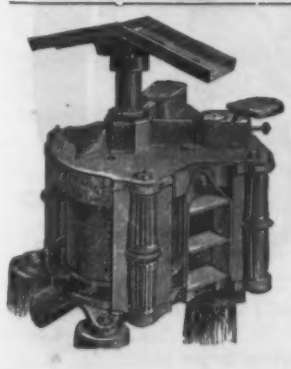

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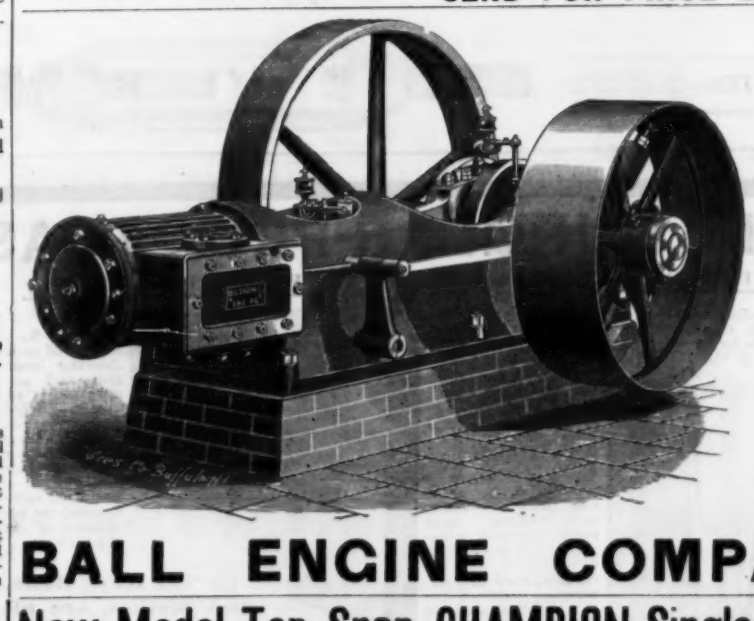

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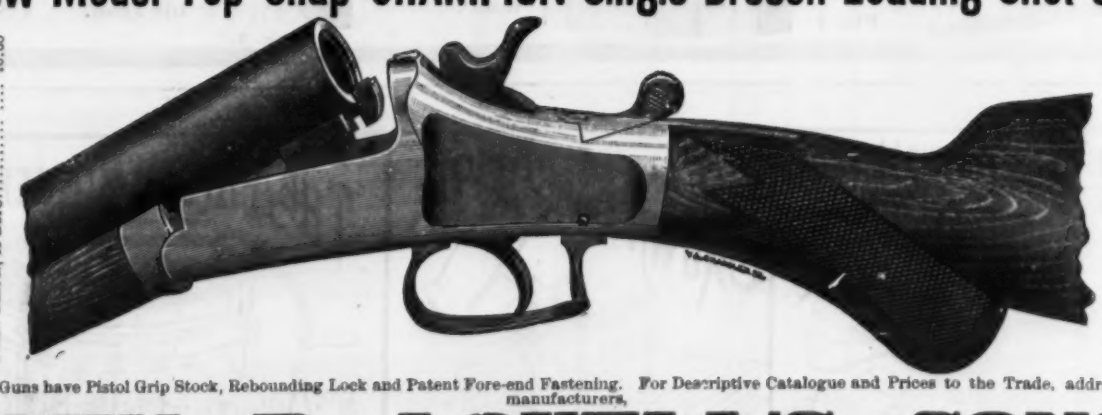

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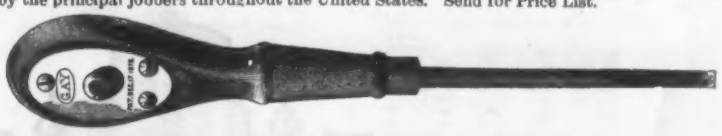

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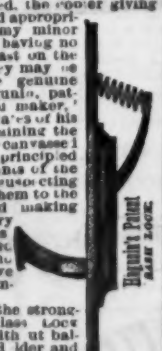

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Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the trade free.

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TAP BOLTS,

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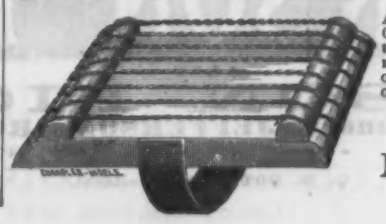

Are best for general use. The most humane and only Comb to use on a horse's legs. It lifts every hair and throws out the dirt. Rubs and cleans the skin, but does not cut or scratch it. Is absolutely without a rival for cleaning a muddy or sweaty animal. Just the thing on a clipped horse.

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BOTH WARRANTED FIRST QUALITY.
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A. M. GARDNER & CO.
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Samples No. 1, 40 cents, No. 5, 60 cents, by mail.
Send for Price-list.

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MADE IN ALL LEADING SIZES AND STYLES FOR Railroad, Mining, Hardware and Furnace Trade

SUPERIOR QUALITY.

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BACK VIEW.

Back Strap completely below the line of wear. **Back Strap** fitting closely around the point of the handle, **positively** prevents handle from working loose.

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SLIDE DOOR HANGERS,

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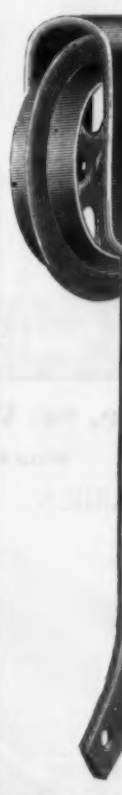

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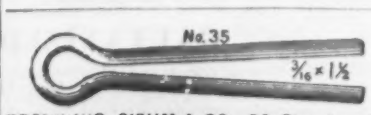

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Belt Hooks, Cotters, Spring Keys, D Rings, Staples, and everything pertaining to wire bending.

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Over Five Hundred Sets Already Under Steam Boilers in the United States.

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See what the Chicago, Rock Island and Pacific R.R. Co are doing:
"We have had them in use some ten months, and are now putting them in all engines as fast as they come in. With your Grate we can run our engines the long run, 228 miles, without cleaning the fire, and when the engine gets through the fire is as clean as when starting out"

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Twelve months in use.

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"We could not have got the necessary steam to run our business without them."
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"We are burning no more of the lowest priced lump coal in the market than we were formerly obliged to use of the highest-priced—saving a good profit, 33 per cent. difference. We are pleased."
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"Have increased our steam supply over 30 per cent., and relatively reduced our coal bill fully 20 per cent."
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"Using no more slack to get the same amount of steam that we have been obtaining from lump coal from the old grates."
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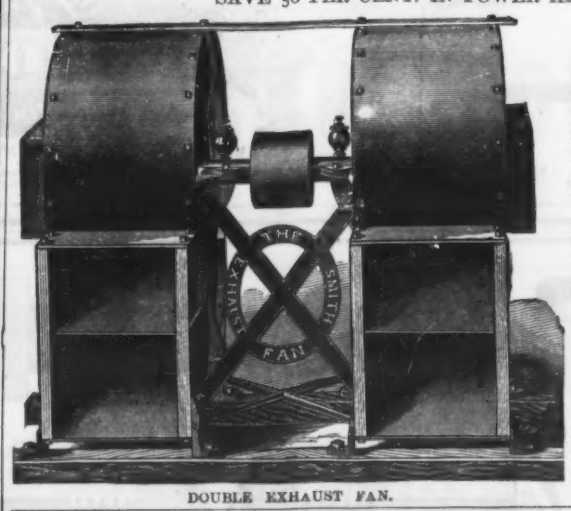
SAVE 50 PER CENT. IN POWER APPLIED, AS COMPARED WITH OTHER MAKES.



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The Fans are specially adapted for removing dust from Emery and other Polishing Wheels, Grindstones and Cleaning Mills; Smoke and Gas from Machine Shops, Steam from Dyeing Establishments, Ventilating Buildings, Tunnels and Mines; removing Bark and Dust from Mills in Tanneries, Shavings and Dust from Planing Mill Machinery and other Wood-Working Establishments.

Cupola and Pressure Blowers are especially adapted to Cupola Furnaces and Forges, and all places where a strong Blast is required.

Every machine tested before shipping, and fully warranted.

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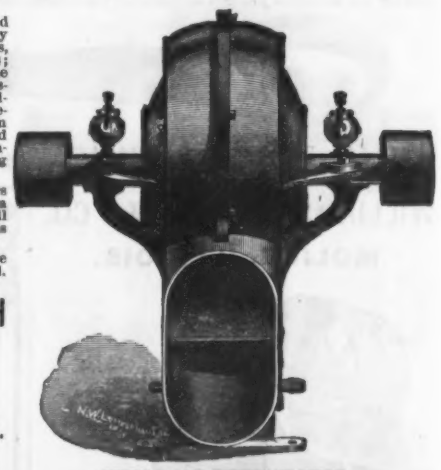
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THE MENEELY HARDWARE CO.,

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MANUFACTURE

HORSE AND CATTLE ROPE GOODS,

ROPE CLAMP SAFETY SNAP AND ADJUSTABLE ROPE BUCKLE.

PAT. IMPROVED GERMAN SNAP.

including Cattle Ties (see cut), Horse Ties, Web Halters, Rope Halters, Rope Driving Reins, Halter Leads, Weight Cords, &c., &c., made up with valuable newly-patented fixtures, among which are the Rope Clamp (doing away with clumsy double-thick splice), Adjustable Rope Buckle (a secure and simple device), Halter Head-piece Clamp (holding head-rope constantly in position), Web Clamp, &c.; also, a complete line of

HARNESS SNAPS,

the Improved German Snap (see cut), with guard, preventing ring working beneath the tongue; the Safety Snap, from which the ring cannot twist out, and the Link Snap, the only perfect chain adjusting and repairing Snap in the market.

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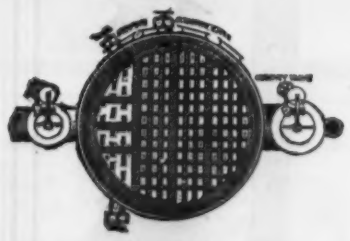
Contract for erecting the same. Also, for Building and Replacing all types of Blast Furnaces. Combining Economy with Efficiency and Modern Improvements, wherein the output of Furnaces is increased fully 50 per cent. and the fuel consumption decreased in the same ratio.

My Blast Engines, Hoisting Engines, &c., have no superior in strength of parts, duty or economy. I solicit an opportunity to make proposals on Blast Furnaces, Rolling Mill or Steel Works Machinery.



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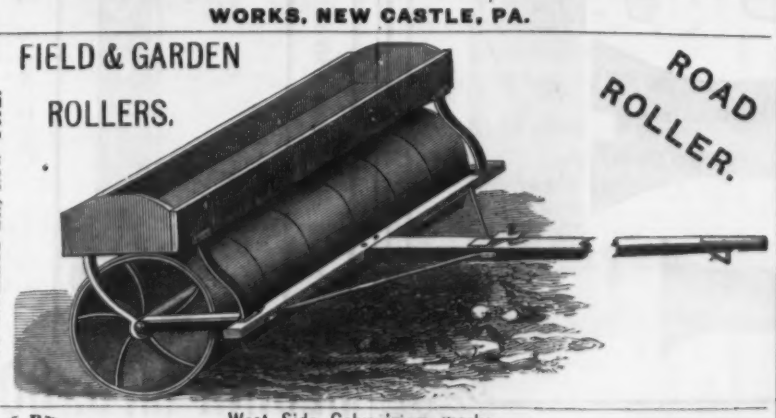

West Side Galvanizing Works.

LION BRAND

PHOENIX BRAND

JOHN MERRY,

Manufacturer and Sole Proprietor of the above well-known Brands of

GALVANIZED SHEET IRON

I desire to caution my friends and the public against purchasing, selling or using any galvanized iron purporting to be of above brands, and being offered by my late partner, E. T. HOOPES, the same being an infringement of my rights and trade-marks, suit having been commenced by me against him for such infringement, and damages arising therefrom. Also that from this date my galvanized iron will have the words "BEST BLOOM" under the "LION" Brand and "CHARCOAL" under the "PHOENIX" Brand.

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APPLE PARER, CORER and SLICER of 1884.

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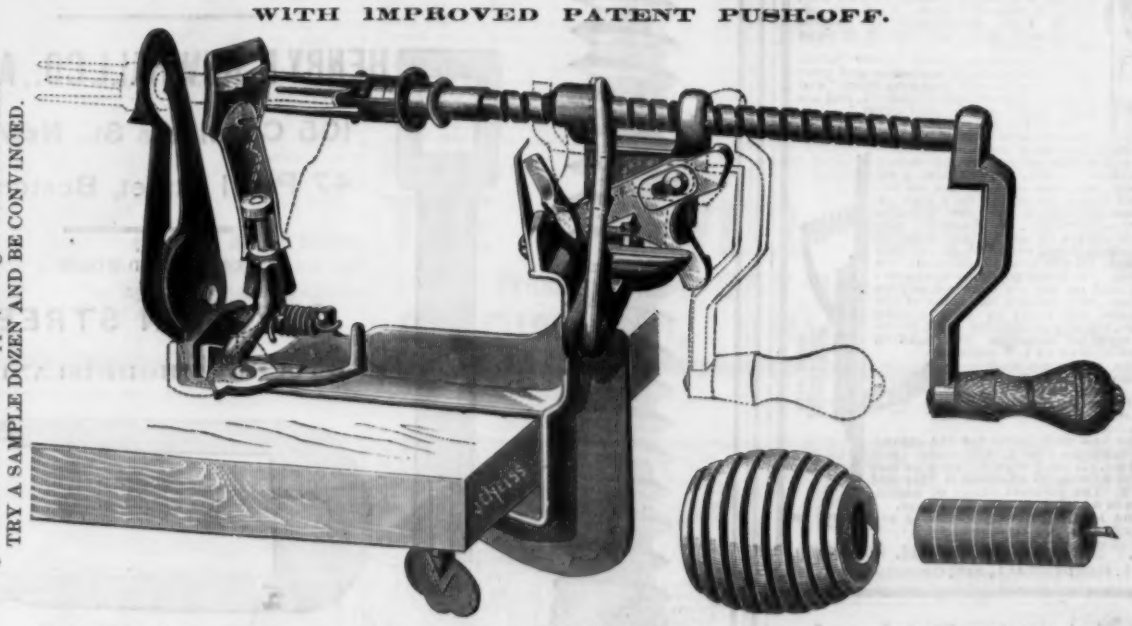
WITH IMPROVED PATENT PUSH-OFF.

This is the only reliable machine ever invented that will entirely pare, core and slice an apple, and give full satisfaction.
TRY A SAMPLE DOZEN AND BE CONVINCED.



We also solicit your orders for our world-renowned Apple Parers, '78, '76, '72, GEM and CHAMPION.

With one hand you can pare, core and slice an apple, and withdraw the fork from the core. Manufactured only by

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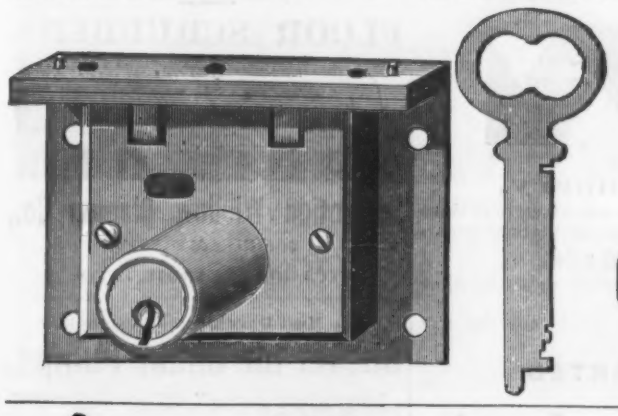

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HAS

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Producing a continuous flow of water, both in suction and discharge. Works smoother and easier than any other force pump in the market. Has Seamless Drawn Brass Cylinders and no stuffing boxes. Never freezes in winter, and is not liable to get out of order. With Hose Attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c. It is especially adapted for all kinds of wells—dug, drilled or driven—and for pumping water long distances from springs.

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FOR USE BY

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(Registered Trade-Mark, May 1st, 1883.)

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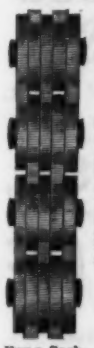

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CABLE AND CHAMPION SASH-CHAINS

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PATENTED ATTACHMENTS.

The most RELIABLE and CHEAPEST article in the market for suspending WINDOW SASHES. **Has Great Tensile Strength,** can be easily applied to any window, and gives SATISFACTION wherever used. **Liberal Discount to the Trade** Now in use in all the leading cities throughout the United States. Have just furnished Chains to the following buildings: Mutual Life Insurance Co., Hoffman House, Williamsburg Fire Insurance Co. and the Navaro Flats.

Samples Sent to Any Hardware House Free on Application.

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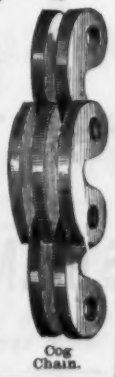
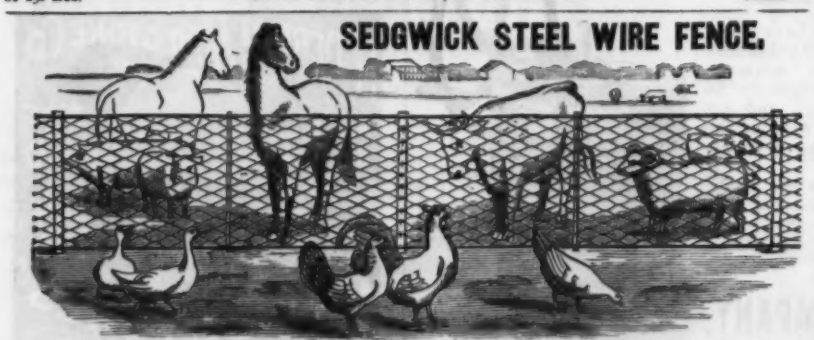


Cog Chain.

For a Sash of 250 Lbs.

SEDGWICK STEEL WIRE FENCE.



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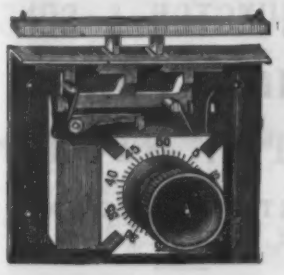
Tests of Materials made daily at the Works, and certificates furnished. Reports copied and kept confidential.



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The Cheapest and Best in the World. Send for Prices.

RETAIL FROM $1.50 TO $3.00. 2500 CHANGES.

FOR ALL PURPOSES.

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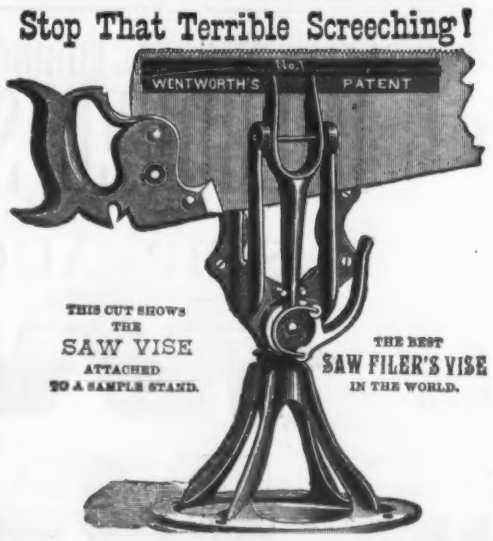

THIS CUT SHOWS THE SAW VISE ATTACHED TO A SAMPLE STAND.

THE BEST SAW FILER'S VISE IN THE WORLD.

WENTWORTH'S

Patent Noiseless

SAW VISE,

WITH RUBBER-CUSHIONED JAWS,

Which Makes Saw-Filing Noiseless.

No. 1—(10 in. Jaw) per doz., **$15.00**
No. 2—(12 in. Jaw) per doz., **21.00**

☞ Liberal Discount to the Trade.

Sample Stand Free with First Order.

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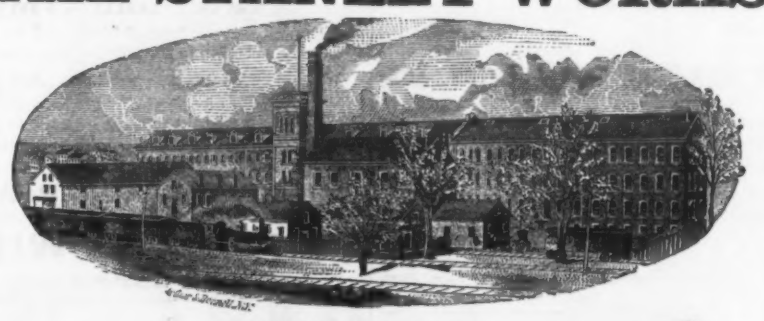

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Goods furnished Plain, Galvanized, Japanned, Bronzed & Nickel Plated.

SEYMOUR MANUFACTURING CO.,

Manufacturers of Superior Grass and Bush

SNATHS, GRAIN CRADLES

of all styles, both with Ring Fastening and with their

CREEDMOOR PATENT FASTENING.

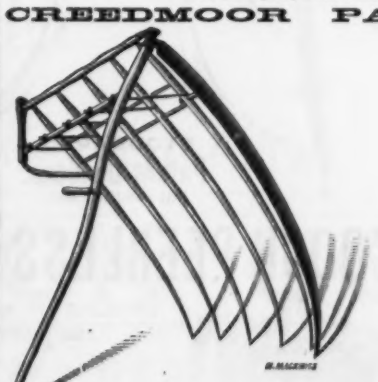

Fig. B.

Figure B shows the Creedmoor Fastening applied to Five-Fingered Dutch Bow Cradle.

Fig. A.

Figure A shows the Creedmoor Fastening to be applied to all styles of Cradles.

The "Creedmoor" Patent Cradle Fastening is provided with an adjustable socket, by which the Cradle head may be easily attached or detached, and the Scythe can be more readily fitted or matched than the ordinary Cradle.

Also WAGON AND BUGGY SPOKES.

FACTORY, SEYMOUR, IND.

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MINERS AND MANUFACTURERS OF

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Steam Packings,
Wick, Fiber,
Mill Board,
Flooring Felt
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Pipe and Boiler Coverings,
Cloth, Yarns, &c.

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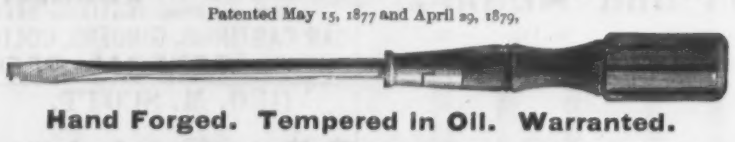
TOWER'S CHAMPION SCREW DRIVER.

SOLID BOLSTER AND FLUTED HANDLES

Patented May 15, 1877 and April 29, 1879.



Hand Forged. Tempered in Oil. Warranted.

EVERY BLADE TESTED AT THE FACTORY.

MADE BY

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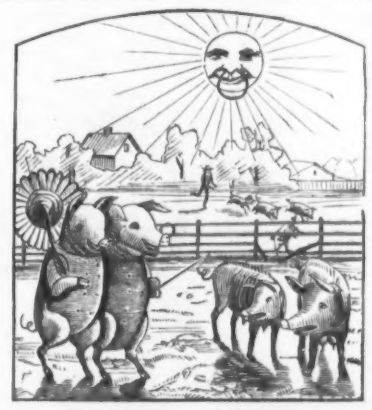

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Hog and Pig Ringers AND RINGS.

DAILY PRODUCTION OF RINGS, **75,000.**

Parties buying and selling Ringers with two or more grooves in jaw, other than those labeled Blair's Patent, March 17, 1874, are infringing, and will be held responsible for damages.

E. BLAIR,

Bucyrus, Ohio.

Patented Articles of

MALLEABLE IRON.

NEW pattern Heavy Screw Clamps strongest in the market.

Hammer's Malleable Iron Oilers, 3 sizes.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.
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For sale by all the principal Hardware Dealers. Send for Price List.

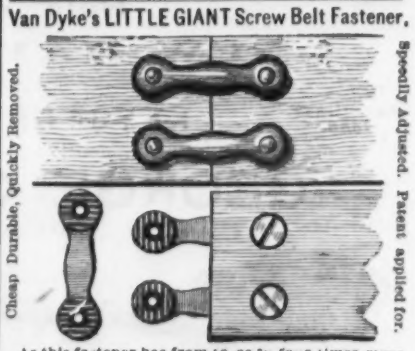
MALLEABLE IRON CASTINGS

Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,

Branford, Conn.

Van Dyke's LITTLE GIANT Screw Belt Fastener.



Cheap Durable, Quickly Removed. Specially Adjusted. Patent applied for.

As this fastener has from three to four times more draw and clamping surface than any other fastener, it is conceded by consumers to be the most reliable, quickly and easily adjusted belt fastener in the market. They are made of Malleable Iron, and attached to the belt with screws made especially for the purpose, and forming a smooth pulley surface like one continuous piece of belting. They can be removed at any time without injury to the belt or fastener, thereby saving expense both in belts and fasteners. These fasteners on an 8 inch 4-ply Rubber Belt are warranted to stand a tensile strain of 6000 lbs.

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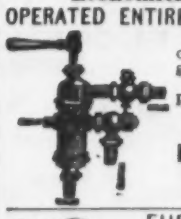
The Latest,

Most Improved, Simplest, and Most Economical Boiler Feed.

OPERATED ENTIRELY BY ONE HANDLE.



Will work as well with hot or cold water, and a perfect grading machine.

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EUREKA SAP SPOUTS.

Sold by Hardware and Tin Dealers.

Samples and terms sent free to the Trade. Address all orders to

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IMPERIAL PORCELAIN COOLERS.

Series D.

Entirely New in Shape, Shades and Decorations.

Six Sizes and Six Shades.

Guaranteed to Hold the Quantity Specified.

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French Sheet Steel, 3 1-4 in. wide, from 4 to 65 thousandths.

Machinists', Silversmiths', Jewelers', Die Sinkers' and Sewing Machine Manufacturers' Supplies.

PATENTED IMPROVED
Double Speed Indicator.
Either Right or Left.

GEO. W. MONTGOMERY.
GEO. W CHURCH.

105 Fulton St., NEW YORK.

STEPHENS' VISES

(FLAT AND SWIVEL BASES.)

Solid Jaws, Steel-Faced and Solid Steel Bars, Adjustable Attachments. For Jewelers, Machinists, Car and Locomotive Works and all other vise work they maintain their superiority in strength, firmness of grip, durability and make, while affording the greatest economy in time and labor. Special Vises for Amateurs and Wood-Workers. Sold by the Trade Send for Circular.

Nathan Stephens,
PROPRIETOR,
41 Dey St., New York.

J. E. REDFIELD,

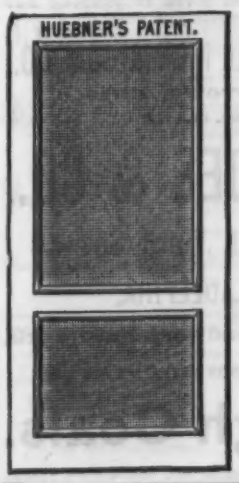
MANUFACTURER OF

TAPS, REAMERS, SCREW PLATES, &c.

ESSEX, CONN.

Our Taps are all Machine Relieved, and we guarantee them to give satisfaction.

HUEBNER'S PATENT.



HUEBNER MANUF'G CO.,

MANUFACTURERS OF

Pat. Door Screens,

ADJUSTABLE WINDOW SCREENS
AND
Window Screen Brackets & Frames,

Factory, 236 to 238 E. Fort Street,
DETROIT, - - - MICHIGAN.

SEND FOR PRICE LIST.

BUTLER & CONSTANT,

18 Warren St., New York, Eastern Depot.

SOLD BY HARDWARE DEALERS EVERYWHERE.

PRIZE MEDALLISTS.

Exhibitions of 1862, 1865, 1867, 1872, 1873, and only Award and Medal for Noiseless Steel Shutters at Philadelphia 1876, Paris 1878, and Melbourne 1881.

CLARK, BUNNETT & CO., Limited,

Late CLARK & COMPANY,

Original Inventors and Sole Patentees of

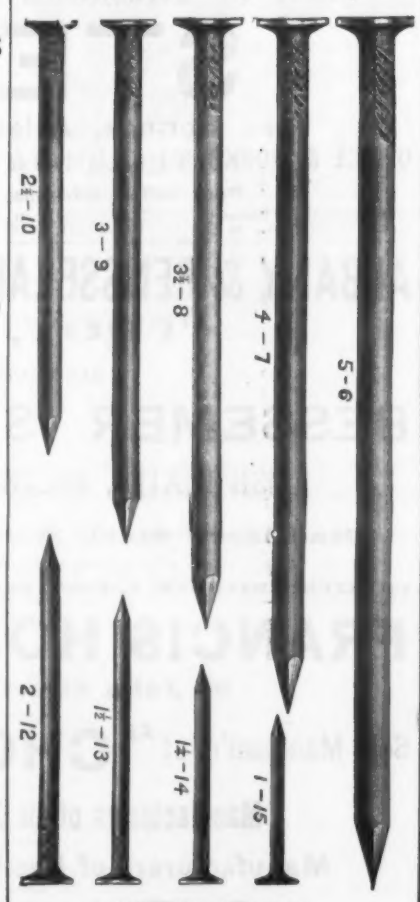
Noiseless, Self-Coiling, Revolving Steel Shutters.

and Burglar Proof. Also, improved ROLLING WOOD SHUTTERS of various kinds, and Patent METALLIC VENETIAN BLINDS.

Office and Manufactory, - - 162 & 164 West 27th Street New York.

THE HP NAIL CO.,

CLEVELAND, OHIO.,



MANUFACTURERS OF

WIRE NAILS

OF ALL KINDS.

Barbed or Plain Steel, Iron and Brass Nails, Cast Steel Wire Brads, Cast Steel Wire Finishing Nails, Cigar Box Nails, Escutcheon Pins, Wagon Nails, Clinch Nails, Hinge Nails, Wire Spikes for Track, Bridge and Dock Work, Tinned Nails, Galvanized Nails.

AN IMPROVED

LEVELING INSTRUMENT.

PRICE OF INSTRUMENT COMPLETE, $20.

Adapted to the Use of Architects, Engineers, Masons, Builders, Farmers and Others.

This instrument is made of Brass and Iron, furnished with both masons' (short metal) and surveyors' tripod, and put up in a handsome wooden box, with strap. The only low-priced Level that can be thoroughly adjusted in the field.

A NEW LEVELING ROD.

This rod is round and made in two sections: is united by a solid screw joint, as if of one length, and has a target. There are two scales one side being Engineer's (feet, 10ths and 100ths), the other Architects' scale (or, feet, inches and 8ths). Price, $6.

WM. T. COMSTOCK, Manufacturer,
6 Astor Place, New York.

Circulars and discount to hardware trade furnished to dealers sending their card.

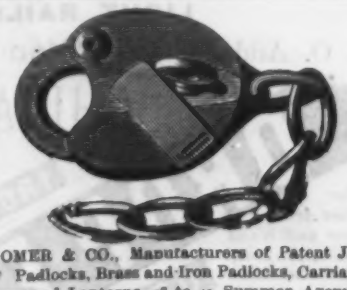
Quick Adjustable Tire Bender.

SIZES.....No. 1 and No. 2.
PRICES..... $10 " $12.

IMPROVED AUTOMATIC TIRE AND AXLE UPSETTER.

SIZES.....No 1 and No. 2.
PRICES..... $10 " $12.

E. C. TROMBLY & CO. MFG. CO,
PLATTSBURGH, N. Y. Box 310.



ROMER & CO., Manufacturers of Patent Jail Padlocks, Brass and Iron Padlocks, Carriage Lamps and Lanterns, 28 to 42 Summer Avenue, Newark, N. J. Illustrated catalogues sent to the trade on application.

GEO. M. EDDY & CO.,

Manufacturers of

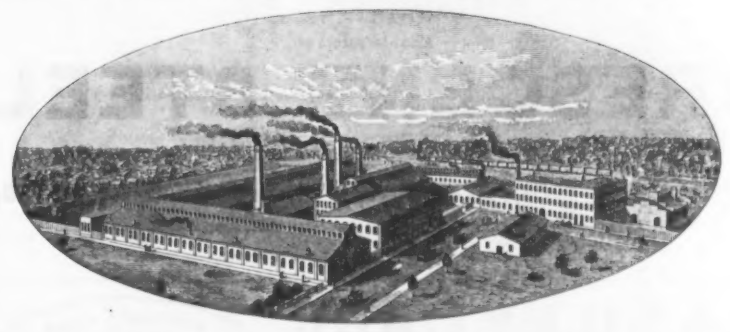
Measuring Tapes

Of Cotton, Linen & Steel,

FOR ALL PURPOSES.

251 to 253 Classon Ave., Brooklyn, N. Y.

THE EBERHARD MANUFACTURING CO.



Carriage, Wagon and Saddlery

HARDWARE.

CLEVELAND, OHIO.

WITHINGTON & COOLEY MANUFACT'G CO.,

JACKSON, MICHIGAN,

Specialties for the Lawn

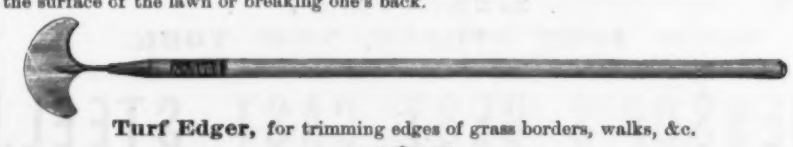
Fox's Lawn Rake

Patented Aug. 2, 1881.

20-inch Head. 29 Steel Teeth.
Steel Wire Brace.

Unexcelled for the removal of clippings from the lawn mower, dry mulch and leaves from the lawn.

The Thistle or Weed Cutter is for cutting thistles, dock or other weeds out of lawns or gardens. With this tool they can be cut up by the root without breaking the surface of the lawn or breaking one's back.



Turf Edger, for trimming edges of grass borders, walks, &c.

Hoes, Forks, Scythe Snaths, Grain Cradles, &c.

New York Agents, FLAGLER, FORSYTH & BRADLEY, 298 Broadway.

Improved Champion Dump Scraper.

WE ARE THE EXCLUSIVE MANUFACTURERS OF

BYRKET'S IMPROVED DUMP AND AUTOMATIC STEEL SCRAPERS.

We manufacture the only successful Automatic Scraper in the world. Our Dumps are the lightest and strongest Scrapers made. We use two pieces of steel pressed into shape, which is superior to the old method of using but one piece, for when that breaks the whole scraper is ruined, while ours is so constructed that we can replace any part at a trifling expense. We make three sizes, to meet the wants of all classes of Earth Workers, Especially suited for Contractors and Township Road Work. Send for circulars. Manufactured by

The Champion Scraper Co.,
TROY, OHIO.

WHITE MOUNTAIN FREEZER CO.

Manufacturers of

SANDS' PATENT TRIPLE MOTION

White Mountain Ice Cream Freezer.

The only Freezer ever made having three distinct motions, thereby producing **finer, smoother Cream than any other Freezer on the market.** Acknowledged by every one to be the best in the world. **Over 300,000 in use to-day.** Outside irons Galvanized, but all inside the can **coated with Pure Block Tin.** Tubs water-proof; easily adjusted and operated. We also carry large stock of Packing Tubs, Packing Cans, Ice Crushers, &c. Send for Price List and Trade Discounts. Address

White Mountain Freezer Co.,
101 E. HOLLIS ST., NASHUA, N. H.

THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

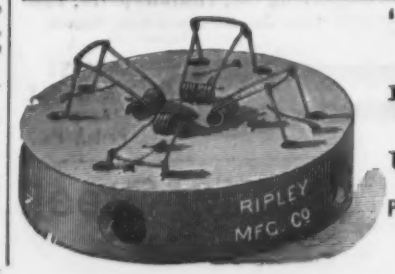
ALSO, LANE'S PORTABLE COFFEE ROASTER,

Will roast 30 to 40 lbs. at once and can be used as a stove at other times. Send for descriptive list to Manufacturers,

LANE BROS., Poughkeepsie, N. Y.

Also sold by leading wholesale houses.

Our agents, John H. Graham & Co., 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.



"COMMON SENSE" MOUSE TRAP.
BEST IN MARKET.
For Home & Export Trade.

RIPLEY MFG. CO.,
Unionville, Ct., U. S. A.,

Manufacturers of

Porcelain-Lined Lemon Squeezers, Mallets, Rose-Wood Faucets, Patent Boot Jacks and Hardware. Fine Wood Turning a Specialty.

ESTABLISHED IN 1859.

THE IRONMONGER AND METAL TRADES ADVERTISER

PUBLISHED EVERY SATURDAY
THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.
OFFICE: 42 CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:
NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply specimen copies free.
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SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.
Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. ***The Week. Legal News. Trade Notes, Bankruptcies, Foreign Notes. Colonial Jottings. Merchants' Circulars, &c.***, are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is $5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful ***Ironmongers' Diary and Text Book,*** a work sold to non-subscribers at 75 cents.
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One page	$20.00	$22.50	$25.00	$30.00	$35.00	$50.00
Two-thirds page	15.00	16.90	18.75	22.50	26.25	37.50
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SPECIAL ISSUES.

In the spring and autumn of each year there is published a special issue, the circulation of which is not less than **Twelve Thousand (12,000)** copies.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, **presented free to every Subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER.** It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follow:
JUNE 21, JULY 19, AUGUST 16, SEPTEMBER 13, OCTOBER 11, NOVEMBER 8, DECEMBER 6; 1884, JANUARY 3 and 31, FEBRUARY 28, MARCH 28, and April 25, 1885.
This supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach, but in the native language of eighty millions of *German*, twenty eight millions of *Italian*, and fifty-one millions of *Spanish* speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.
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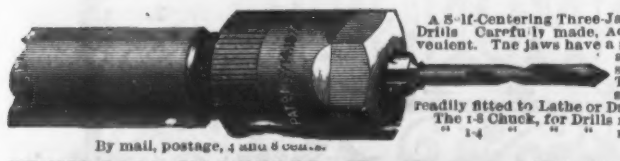
One-third page	12.50	14.10	15.65	One-sixteenth page	3.20	3.40	4.00

Advertisers will do well to use Illustrations freely. Where economy of space is an object, a left page illustrated and described in one language can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of more than twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

TRUMP CHUCK.



A Self-Centering Three-Jawed Steel Chuck for Small Drills. Carefully made, Accurate, Durable and Convenient. The jaws have a good bearing on the drill, and hold securely either straight or taper shanks. They are made on solid steel plug centered and readily fitted to Lathe or Drill Press.

The 1-8 Chuck, for Drills 1-8 and under, price $1.50
" 1-4 " " " 1-4 " " 2.50

By mail, postage, 4 and 8 cents.

TRUMP BROS. MACHINE CO., Manufacturers, Wilmington, Del., U. S. A.

WROUGHT IRON TACKLE BLOCKS.

Swivel Hooks for Rope or Chain,

POLISHED GROOVES, ALL SIZES IN STOCK.

Also Pulley Blocks for Wire Rope,

Headquarters for the

IRVING BRAND WOODEN PULLEY BLOCKS,

McCOY & SANDERS, Manuf'turers,

26 Warren Street, New York.

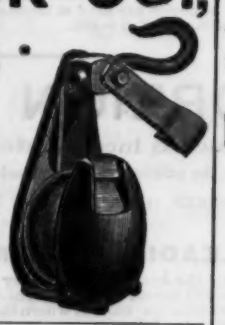
CLEVELAND BLOCK CO.,

MANUFACTURERS OF

TACKLE BLOCKS

WITH

MALLEABLE IRON SHELLS.



As compared with Wooden Blocks, these are Stronger, Lighter, Simpler, more ship-shape, vastly more durable, cheaper, and have wider scores. They have all the advantages of Wrought Iron Blocks, and more, at much less cost. Illustrated Catalogues mailed from

129 River St., Cleveland, Ohio,

or New York Warehouse, 100 Chambers St., HORACE F. SISE, Agent; DODGE, HALEY & CO., 45 Oliver St., Boston; GOULDS & AUSTIN, 169 Lake St., Chicago.

THE CINCINNATI CORRUGATING CO.,

CINCINNATI, OHIO.

MANUFACTURERS OF

CORRUGATED SHEET IRON.

STEEL and ZINC.

For Rolling Mills, Blast Furnaces, Foundries, Machine Shops, Car Shops, Boiler and Engine Rooms, Etc.

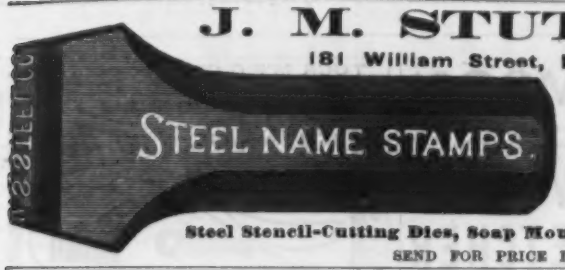
Superior Corrugated Roofing, Siding, Ceiling, Arches, Lath, Etc.

Fire, Water and Wind Proof. Light, Cheap and Durable.

Send for Descriptive Illustrated Catalogue.

J. M. STUTZMAN,

181 William Street, NEW YORK.



Steel Alphabets,

Die Letters for Seal Engravers.

BRANDS, SEALS, POSTMARKERS,

Door Plates.

Steel Stencil-Cutting Dies, Soap Moulds and Brass Stamps.

SEND FOR PRICE LIST.

HAIGHT & CLARK,

ALBANY, N. Y.,

MANUFACTURERS OF FINE GRAY IRON CASTINGS, ORNAMENTAL AND ART CASTINGS

OF EVERY DESCRIPTION.

Rosettes and Pickets for Wire Workers. Castings for Furniture and Piano Manufacturers. Stove and Metal Patterns of all kinds a specialty. Correspondence solicited.

JAPANNING. NICKEL PLATING. BRONZING.

ASHLEY & REMINGTON,

Manufacturers' Agents and Iron Brokers.

All Kinds of Manufactured Iron

OLD RAILS AND RAILROAD SCRAP BOUGHT AND SOLD.

Correspondence solicited. Office, 139 W. Sixth St., Kansas City, Mo.

JOHN T. LEWIS & BROS.,

No. 231 South Front St.,

PHILADELPHIA.

JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil,

AND PAINTERS' COLORS.

JOHN JEWETT & SONS

Manufacturers of the well-known brand of

WHITE LEAD.

JEWETT & SONS' PERFECTLY PURE WHITE LEAD.

TRADE MARK.

ALSO MANUFACTURERS OF

LINSEED OIL.

181 Front Street, NEW YORK.

ATLANTIC WHITE LEAD WARRANTED PURE ROBERT COLGATE & Co. TRADE MARK

The Atlantic White Lead and Linseed Oil Co.,

Manufacturers of

White Lead (Atlantic), Red Lead, Litharge, Glass Makers' Litharge and Orange Mineral;

LINSEED OIL,

Raw, Refined and Boiled.

ROBERT COLGATE & CO.,

287 Pearl St., NEW YORK.

SALEM LEAD COMPANY,

CORRODERS AND MANUFACTURERS OF

PURE WHITE LEAD.

SALEM LEAD CO. 100 WARRANTED PURE SALEM, MASS.

ALSO MANUFACTURERS OF

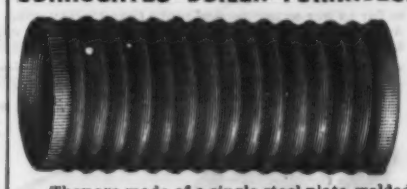
Lead Pipe and Narrow Sheet Lead.

SALEM, MASS.

F. A. BROWN, Treas.

FOX'S

CORRUGATED BOILER FURNACES.



1. They are made of a single steel plate, welded at the bottom, with no joint in contact with the flame.
2. They give 50 per cent. more evaporative power.
3. They throw off all scale by their elasticity.
4. They do not destroy themselves by the variation of temperature, contracting and expanding as they do like an accordeon. They have not enough stiffness to work against the boiler heads.
5. They require, to comply with the rules of the Board of Trade in England, only *one-half* the thickness of plate of plain furnaces for equal working pressure.
6. Where a plain furnace of equal length, diameter and thickness collapsed at 225 pounds, the Corrugated stood 1020 pounds per square inch.

Since five years 700 steamers were fitted with these furnaces, among them the Alaska, Oregon, City of Rome, Servia, Elbe, Werra, Fulda, &c.

Perfect safety and greatest economy combined.

For particulars, apply to

Hartmann, Le Doux & Maecker,

134 PEARL ST., NEW YORK,

Sole Agents and Assignees of U. S. Patents.

Prouty's Patent PEERLESS FORCE PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING PACKING.

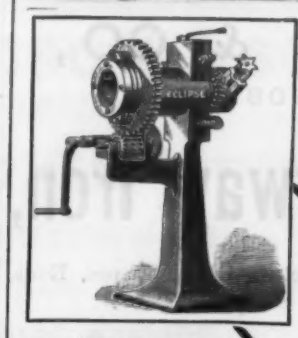
It will throw a continuous jet FROM FORTY TO SIXTY FEET. A new pattern jet and spray nozzle is sent with each pump.

Especial attention is called to the material and workmanship exhibited in these pumps.

THE NEW ENGLAND BUTT CO.

PROVIDENCE, R. I.

NEW YORK OFFICE, 99 Chambers St.



THE "ECLIPSE" HAND PIPE MACHINE.

Simple, powerful, portable, inexpensive. With it one man can easily cut 6-inch Pipe.

MADE IN THREE SIZES.

No. 1.—CUTS AND THREADS ⅛ to 2 inch.
No. 2.—CUTS AND THREADS 2½ to 4 inch.
No. 3.—CUTS AND THREADS 2½ to 6 inch.

SEND FOR CIRCULAR AND PRICES.

THE "ROUSE" PIPE WRENCH

IS THE SIMPLEST AND MOST POWERFUL TOOL OF ITS CLASS IN THE MARKET.

WRITE US FOR PRICES.

PANCOAST & MAULE,

243 and 245 South Third Street, PHILADELPHIA.

Gentlemen.—This cut illustrates our

CAST IRON

Furnace Lamps

which are superseding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania.

We call your attention to and solicit your order for them, confidently asserting that they are an **A No. 1 article in every respect.**

Sample sent if desired.

PRICE, $12 PER DOZEN.

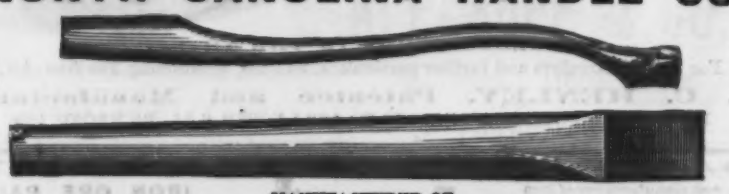
The Taylor & Boggis F'dry Co.,

CLEVELAND, O.

V. G. HUNDLEY,

PROPRIETOR OF

NORTH CAROLINA HANDLE CO.



MANUFACTURER OF

Handles and Spokes,

79 Reade Street and 97 Chambers Street, - - - NEW YORK.

HARDWARE COMMISSION MERCHANT.

SHEET-IRON BUILDING MATERIALS.

ROOFING. Patent Cap Seam Roofing, in Four Styles. In Sheets or Rolls.

SIDING. Crimped Iron, for Siding or Roofing for Elevators, Mills and Factories.

CEILING. Paneled and Crimped Iron Ceiling. Durable, Attractive, Fire-proof.

Send for Prices and Circulars to

A. NORTHROP & CO., 97 First Ave., PITTSBURGH.

PHILADELPHIA.

Lloyd & Supplee Hardware Co.

Terms, 30 days. For 60 or 90 days, interest added at 8 per cent. per annum.

Anvils:
Peter Wright's, ℘ ℔ .....11 @ 11¼¢
Over 200 ℔ .....11¼¢
Trenton .....9½¢
Eagle Anvils, American, 10¢ .....dis. 20 %

Apple Parers:
Globe Apple Parers .....$5.50 net
Penn Apple Parers .....5.50 net
Lots of 10 to 25 dozen, special prices.

Axes:
Hunt's Kentucky and Yankee, ℘ doz. net $7.25
Robert Mann, ℘ doz. net 7.25
Richland Chief 7.25
Beveled Axes .....add 50¢
Double Bit Axes, net $12.00

Augers and Auger Bits:—New List, January 7, 1880.
Bates' Nut Augers .....dis. 55 @ 60 %
Cook's Augers .....dis. 40&10&10 %
Watrous' Ship Augers .....dis. 15 %
Benjamin Pierce Auger Bits .....dis. 40 %
Griswold Auger Bits .....dis. 55 @ 60 %
Cook's Auger Bits .....dis. 40&10&10 %
Jennings' Auger Bits, new list, Jan. 1, 1884 .....dis. 25 %
Bonney's Pat. Hol. Augers, list $48 ℘ doz .....dis. 40 %
Stearns' Pat. Hol. Augers, list $48 ℘ doz .....dis. 20&10 %

Balances:
Light and Common .....dis. 40 %

Bells:
Bevin Bros. Mfg. Co. Light Hand Bells .....dis. 70&10 %
Swiss Pattern Hand Bells .....60 %
Connell's Door Bells .....dis. 15&10 %
Gt. Western & Kentucky Cow, new list .....dis. 60 %

Boring Machines.
Upright, without Augers .....List, $5.50 } dis. 45 @50 %
Angular, without Augers .....List, 6.75 }

Bolts.—Eastern Carriage Bolts .....dis. 85 @ 85&5 %
Philadelphia Carriage Bolts .....new list, dis. 70&10 %
Stanley, Wrought Shutter .....dis. 50&10 %

Braces.—Barber's .....dis. 40&5 %
Backus .....dis. 50&5 %
Spofford .....dis. 50&5 %
American Ball .....dis. 55 %

Butts.—Cast Fast Joint, Narrow .....dis. 40&10&10&10 %
Cast Fast Joint, Broad .....dis. 40&10&10&10 %
Cast Loose Joint, Narrow .....dis. 60&10&10 %
Cast Loose Joint, Broad .....dis. 60&10&10 %
Cast Acorn, Loose Pin .....dis. 60&10&10 %
Cast Acorn, Japanned .....dis. 60&10&10 %
Cast Mayer's Loose Joint .....dis. 60&10&10 %
Wrought Loose Pin .....dis. 60&7½ %
Wrought Table Hinges and Back Flaps .....dis. 60&2½ %
Wrought Narrow Fast .....dis. 60&2½ %
Wrought Loose Joint .....dis. 60&7½ %

Blind Butts.
Parker .....dis. 70&2 %
Clark .....dis. 75 %
Shepard .....dis. 75 %
Lull & Porter .....dis. 75&10 %
Huffer's .....dis. 50 %

Chains.—German Halter and Coil, list December 31, 1881 .....dis. 50 @ 55 %
Galvanized Pump .....℘ ℔ 7¢ net
Best Proof Coil Chain—English.

℘ ℔	12	8¼	7¼	6¼	6	5¾ gold.
	3-16	¼	5-16	⅜	7-16	½ in.

Chisels.—Socket Framing .....dis 70&10 %
Socket Firmer .....dis 70&10 %
Butcher's .....$5.00@$5.25 to £ gold

Casters.—Bed (new list July 1, 1880) .....dis 45@50 %
Plate .....dis 45@50 %

Coffee Mills.—Box and Side (new list Jan. 1, 1880 .....dis 50 %
Enterprise .....dis 20&10 %

Cutlery.—Walden Pocket .....new list net
Pennsylvania Knife Co .....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s .....dis 70 %
Adjustable Handle .....dis 20 %

Fry Pans.
Tinned .....dis 45 %

℘ doz ...	$3.50	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No	0	1	2	3	4	5	6	7	8

Burnished .....dis. 60&10&10 %

℘ doz ...	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
No	0	1	2	3	4	5	6	7	8

Files.
Nicholson .....dis 40 @ 40&10 %
Disston .....dis 40 @ 40&10 %
Butcher .....

Fluting Machines.
Eagle—3½ in. roll .....each, $2.15 } dis 35 %
Eagle—5½ in. roll .....each, 2.85 }
Crown—4½ in. roll .....each, 3.50 }
Crown—6 in. roll .....each, 4.00 } dis 35 %
Crown—8 in. roll .....each, 6.50 }
Geneva Fluter .....dis 25 %
Favorite com. Fluter and Sad Iron .....℘ doz., $10.50 net

Hammers.
Yerkes & Plumb's, new list .....dis 30 %
Maydole Hammers .....dis 15 %
Howell A. E. Nail Hammers .....℘ doz., net $3.75

Handles.
Disston Loop Handles Cross-Cut .....33¢ pair net
Boynton Loop Handles Cross-Cut .....33¢ pair net

Hatchets.
Yerkes & Plumb, new list .....dis 35 %
Hunt .....dis 30 %

Hinges.
Strap and T .....dis 60, 10, 5&2 % cash

Horse Nails. Nos.	5	6	7	8	9	10	
Globe	26	23	21	20	19	18	dis 10&5 %
Vulcan	26	23	21	20	19	18	dis 12½ %
Ausable	30	27	25	24	23	22	dis 25&10 %
" Pol'ed and P't'd & Blued & P't'd	31	28	26	25	24	23	dis 25&10 %
Clinton		23	21	20	19	18	dis 25&10 %
" Pol'ed & P't'd.		24	22	21	20	19	dis 25&10 %
Saranac	26	23	21	20	19	18	dis 16⅔ %

Hay and Straw Knives.
Lightning .....℘ doz., net $18.00
Electric .....℘ doz., net 18.00
Wadsworth .....℘ doz., net 10.50
Walton Straw Knives .....℘ doz., net 17.00

Locks and Knobs.
Branford .....new list, dis 60&2 % cash
Gaylord Cabinet .....dis 45&2 %
Parker's Cabinet .....dis 45&2 %
American Padlocks .....dis 45&2 % cash
Scandinavian Padlocks .....dis 50 %

℘ doz ..	$5.00	5.50	6.50	7.50	8.50	10.00	12.50	dis 60 %
No	57	58	59	60	61	62	63	
℘ doz		$18.00		26.00		33.00		dis 60 %
No		64		65		66		

Lanterns.
Buckeye .....large list, net; small list, net
Tubular .....No. 0, $7.50; No. 1, $9.00 ℘ doz. net
Guards, 40¢ extra.

Lawn Mowers.—Pennsylvania ..... } new list,
Philadelphia ..... } dis 30&5
Excelsior ..... } &3 %

Lawn and Garden Pumps.
Holland Patent .....list, $5.00, dis 10 %

Mattocks.
Long and Short Cutter .....new list, 50 %
Pennsylvania Pattern .....dis 50 %

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets .....dis. 20&10 %
Stebbins' Gates .....dis. 70&10 %
Lincoln's Gates .....dis. 60&10 %
Landers, Frary & Clark's Petroleum .....dis. 25&10 %
Brass Liquor Cocks, new list Jan. 1, 1880 .....dis. 55 %
Cork Lined Cocks .....dis. 70 %

Meat Cutters.
Dixon's .....dis. 40 %
Woodruff .....dis. 40 %
Stowe .....dis. 40 %
Hale's .....new list, dis. 50, 10&2 cash
American .....dis. 25 %
Stuffers .....dis. 40 %
Enterprise Stuffers .....dis. 25 %

Planes.—Sandusky Tool Co .....dis. 20 %
Ogonts .....dis. 25 %
Ohio and Auburn .....dis. 20 %
Bailey (S. R. & L. Co.) .....dis. 20&10 %

Plane Irons.—Ohio Tool Co .....dis. 20&10 %
Butcher's .....$5.00 @ 5.25 to £

Plumbs and Levels.
Stanley's Adjustable .....dis. 65&10 %
Stanley's Non-Adjustable .....dis. 65&10 %

Picks.—New list .....50 %

Razor Strops.
Lamont Combination .....℘ doz. $4.00
Lamont Combination .....1 gross lots $42.00
Imitation Emerson .....℘ doz. $2.00

Rules.—Stanley Boxwood .....dis. 70&10 %
Stanley Ivory .....dis. 55 %

Steelyards.—Hart's Pattern .....dis. 40 %

Per doz	$14.50	17.75	21.00	26.50	31.00	35.50
Lbs	50	100	150	200	250	300

American Pattern .....dis. 40 %

Per doz	$8.00	10.25	13.75	15.00	16.75	19.50
Lbs	50	100	150	200	250	300

Scale Beams .....45&10 %
Custers .....25 %

Squares.
Steel and Iron .....dis. 50; full case .....dis. 50&10&2 for cash
Try Squares, Stanley .....dis 55&10 %
Disston's Try Squares .....dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened .....℘ doz $9.00 }
Clipper No. 10, Bronzed Blade, Boxed and Sharpened .....℘ doz $8.50 } 30
Clipper No. 5, Painted Red, Boxed and Sharpened .....℘ doz $8.00 }

Saws.—Disston's Hand, Panel and Rip .....dis 20 %
Disston's Circular .....dis 40 %
Cross-Cut No. 2, Plain Tooth .....dis 40 %
Cross-Cut Patent Tooth .....dis 40 %
Cross-Cut Champion Tooth .....dis 40 %
Boynton's Lightning Cross-Cut, new list .....dis 40 %
Boynton's Lightning Buck Saws, Cross-bar .....dis 40 %

Shovels and Spades.
Oliver Ames & Sons, new list .....dis 17½ %
Griffiths .....dis 50 @ 50&10
Rowland .....dis 50 @ 50&10

Sad Irons.—4 to 10 ℔ .....℘ ℔ 2¾ @ 3¢
Mrs. Potts' Patent .....dis 35 %

Stone.
Washita Extra .....℘ ℔ 23½¢
Washita No. 1 .....℘ ℔ 16¢
Washita No. 2 .....℘ ℔ 13¢
Washita Slips .....℘ ℔ 36¢
Washita Axe .....℘ ℔ 13¢ net
Hindostan Oil Stone No. 1 .....℘ ℔ 6¢ }
Hindostan Axe Stone .....℘ ℔ 8¢ } dis 40 %
Hindostan Slips .....℘ ℔ 10¢ }

Screws.
Flat Head Iron .....dis 75 %
Flat Head Brass .....dis 75 %
Round Head Brass .....dis 65 %
Round Head Iron .....dis 70 %

Spoons.
Plated .....dis 50&5&5 %
German Silver .....dis 40&5 %
Britannia, Boardman's .....dis 60 %
Britannia, Parker's .....dis 60&10 %
Tinned .....dis 10 %

Springs.—Torrey .....dis 50 %
Gem No. 3 small Japanned .....$2.00 } dis 50&10 %
Gem No. 2 medium Japanned .....2.75 }
Coil No. 10 ℘ gross net $6.00
Other Standard Springs .....dis 50&10 %
Warner Door Springs, ℘ doz. $2.50 .....dis 40 %
Standard Spring Hinges—
Single No. 0, ℘ doz. net $1.25
Single No. 1, ℘ doz. net 1.50
Other Standard Spring Hinges .....dis 25&10 %

Stocks and Dies .....dis 10 and 5 %

Stove Polish.—Gem .....℘ gross, $4.50, dis 5 %
Dixon .....6.00, dis 10 %
Fire Fly .....$3.00 gross, net

Tacks .....dis 30&10 %
Shoe Nails—4-8, and over, 8¢ ..... } 10 %
Shoe Nails—3½-8, and under, 9¢ ..... }
Double Pointed Tacks .....dis 55 %

Traps.
Genuine Oneida—Newhouse .....dis 35 %
Im. Oneida—Newhouse list. First qual .....dis 60&10 %

Vises.—Solid Box. Trenton new list .....dis 45 @ 50 %

Wrenches.—Agricultural .....dis 70&10 %
Coes' Genuine .....dis 60&3 %
Coes' Mechanics' .....dis 60&10&3 %
Coes' Mechanics,' Mall. Bar .....dis 70&15 %

Wire.
Bright or Annealed, No. 0 to 18 .....dis 65 %
Bright or Annealed, No. 19 to 26 .....dis 62½ @ 67½ %
Bright or Annealed, No. 27 to 36 .....dis 70 @ 70&10 %
Coppered, 0 to 18 .....dis 52½ @ 57½ %
Tinned Broom Wire .....dis 57½ @ 60 %
Galvanized Barb Wire .....7½¢
Painted Barb Wire .....6½¢
Galvanized. No. 7 to 18 ...Market List, dis 47½ @ 50 %

Wringers.
Peerless No. 2½ .....$33.00 }
Peerless No. 2 .....34.50 }
Universal No. 2½ .....33.00 }
Universal No. 2 .....34.50 } Net @ 10 %
Novelty No. 2, for common tubs .....33.00 }
Novelty No. 3, " " .....37.50 }
Excelsior E, for stationary tubs .....42.00 }
Excelsior F " " .....46.50 }

PITTSBURGH.

Merchant Iron.

Terms.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 ℘ cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
1½ to 4 by ⅜ to 1 inch .....2.5¢
4½ to 6 by ⅜ to 1 " .....2.6¢
1⅛ to 6 by 1⅛ to 1¼ " .....2.9¢
1¼ and 1⅜ by ⅜ to ⅜ " .....2.6¢
1 and 1⅛ by ⅜ to ⅜ " .....2.7¢
⅝, ¾ and ⅞ by ⅜ to ⅝ inch .....2.9¢

Rounds and Squares.
1 to 1⅛ .....2.5¢ | ⅝ to 9-16 .....2.7¢
2 to 2⅜ .....2.7¢ | ½ to 7-16 .....2.9¢
2¾ to 3⅛ .....3.0¢ | ⅜ .....3.1¢
3⅜ to 4 .....3.5¢ | 5-16 .....3.3¢
4⅛ to 5 .....4.0¢ | ¼ .....3.5¢
⅝ to ⅞ .....2.6¢ | 3-16 .....5.5¢

Oval Iron.
⅞ to 1⅛ .....2.9¢ | ½ .....3.3¢
⅝ to ¾ .....3.1¢ | ⅜ .....3.7¢

Half Oval and Half Round.
⅞ to 1¼ inch .....3.2¢ | ½ inch .....4.0¢
⅝ to ¾ " .....3.7¢ | ⅜ " .....5.5¢

Horse Shoe.
⅝ to 1⅛ by 5-16 to ⅞ inch .....3.5¢

Wagon Box Iron.
⅞ inch, Nos. 13 and 14 .....3.7¢
⅞ " " 11 and 12 .....3.5¢
¾ " " 13 and 14 .....4.0¢
¾ " " 11 and 12 .....3.8¢
⅝ " " 13 and 14 .....4.4¢
⅝ " " 11 and 12 .....4.1¢

Heavy Bands.
3½ to 6 by ¼ and 5-16 inch .....2.7¢
1⅜ to 3¼ by ¼ and 5-16 " .....2.7¢
1 to 1⅜ by ¼ and 5-16 " .....2.8¢
¾ to ⅞ by ¼ and 5-16 " .....3.0¢
⅝ and ⅝ by ¼ and 5-16 " .....3.5¢

Light Bands.
1⅛ to 6 by ⅛ to 3-16 .....3.0¢
1⅛ to 6 by Nos. 11 and 12 .....3.1¢
1 to 1⅜ by ⅛ to 3-16 .....3.1¢
1 to 1⅜ by Nos. 11 and 12 .....3.2¢
⅞ and 13-16 by ⅛ to 3-16 .....3.4¢
⅞ and 13-16 by Nos. 11 and 12 .....3.5¢
¾ and 11-16 by ⅛ to 3-16 .....3.7¢
¾ and 11-16 by Nos. 11 and 12 .....3.8¢
⅝ and 9-16 by ⅛ to 3-16 .....4.0¢
⅝ and 9-16 by Nos. 11 and 12 .....4.1¢
½ inch by ⅛ and 3-16 .....4.3¢
½ inch by Nos. 11 and 12 .....4.4¢

Hoop Iron.
1½ to 4, Nos. 13, 14 and 15 .....3.3¢
1½ to 2, Nos. 16, 17 and 18 .....3.4¢
1½ to 2, No. 19 .....3.5¢
1½ to 2, No. 20 .....3.6¢
1½ to 2, No. 21 .....3.7¢
1½ to 2, No. 22 .....3.8¢
15-16, 1, and 1⅛, Nos. 13, 14 and 15 .....3.5¢
15-16, 1, and 1⅛, Nos. 16, 17 and 18 .....3.6¢
15-16, 1, and 1⅛, Nos. 19 and 20 .....3.7¢
15-16, 1, and 1⅛, No. 21 .....3.8¢
15-16, 1, and 1⅛, No. 22 .....3.9¢
⅞, Nos. 13, 14 and 15 .....3.7¢
⅞, Nos. 16, 17 and 18 .....3.8¢
⅞, Nos. 19 and 20 .....3.9¢
⅞, No. 21 .....4.0¢
⅞, No. 22 .....4.1¢
13-16, Nos. 13, 14 and 15 .....3.9¢
13-16, Nos. 16, 17 and 18 .....4.0¢
13-16, Nos. 19 and 20 .....4.1¢
13-16, No. 21 .....4.2¢
13-16, No. 22 .....4.3¢
¾, Nos. 13, 14 and 15 .....4.0¢
¾, Nos. 16, 17 and 18 .....4.1¢
¾, Nos. 19 and 20 .....4.2¢
¾, No. 21 .....4.3¢
¾, No. 22 .....4.4¢
11-16, Nos. 13, 14 and 15 .....4.2¢
11-16, Nos. 16, 17 and 18 .....4.3¢
11-16, Nos. 19 and 20 .....4.4¢
11-16, No. 21 .....4.5¢
11-16, No. 22 .....4.6¢
⅝, Nos. 13, 14 and 15 .....4.4¢
⅝, Nos. 16, 17 and 18 .....4.5¢
⅝, Nos. 19 and 20 .....4.6¢
⅝, No. 21 .....4.7¢
⅝, No. 22 .....4.8¢
⅝, No. 23 .....4.9¢
9-16, Nos. 13, 14 and 15 .....4.6¢
9-16, Nos. 16, 17 and 18 .....4.7¢
9-16, Nos. 19 and 20 .....4.8¢
9-16, No. 21 .....4.9¢
9-16, No. 22 .....5.0¢
9-16, No. 23 .....5.1¢
½ inch, Nos. 13, 14 and 15 .....4.8¢
½ inch, Nos. 16, 17 and 18 .....4.9¢
½ inch, Nos. 19 and 20 .....5.1¢
½ inch, No. 21 .....5.2¢
½ inch, No. 22 .....5.3¢
½ inch, No. 23 .....5.4¢

The prices under Hoop Iron do not apply to Cotton Ties.

1-10¢ ℘ ℔ extra will be charged for each gauge lighter than the lightest indicated.

1-10¢ ℘ ℔ extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1¼ to 2 in., cut to length.
9 to 11 ℔, ℘ set of 6 hoops .....3.5¢
8 ℔ and less than 9 ℔, ℘ set of 6 hoops .....3.6¢
Less than — ℔, ℘ set of 6 hoops .....3.8¢

Extras for Cutting to Length all Preceding Iron,
All Iron, including Tire .....1.10¢

Tank Iron.
No. 9 and heavier .....3.3¢
Plow Slabs .....3.5¢
Plow Wings .....3.8¢

Sheet Iron.

	Common.	Charcoal.	Juniata.
Nos. 10 to 14	3.5¢	5.0¢	6.5¢
Nos. 15 to 17	3.8¢	5.3¢	6.8¢
Nos. 18 to 21	4.1¢	5.6¢	7.1¢
Nos. 22 to 24	4.3¢	5.8¢	7.3¢
Nos. 25 and 26	4.5¢	6.0¢	7.5¢
No. 27	4.7¢	6.2¢	7.7¢
No. 28	5.1¢	6.6¢	8.1¢

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10¢ extra.

Wood's Patent Planished Sheet.
1st quality (A) .....10½¢ | 2d quality (B) .....9.0¢

Galvanized C. H. B.—(Charcoal Hammered Blooms.)
Nos. 14 to 20 .....12¢ | No. 27 .....15¢
Nos. 21 to 24 .....13¢ | No. 28 .....16¢
Nos. 25 and 26 .....14¢ | No. 29 .....18¢
50 @ 52½ % discount.

Coal Screen Iron.
1¾ by ⅜ by 5-16 .....3.0¢ | 1 by ⅜ by 5-16 .....3.5¢

Angle Iron.
2½, 3, 3½ and 4 inch .....3.3¢
1⅝, 1¾, 2 and 2¼ " .....3.3¢
1¼ inch .....3.4¢
1 " .....3.6¢
1⅛ by 1 inch, for Plow Handles .....3.8¢
1⅛ by ¾ " " " .....3.8¢
1⅜ by ⅝ " " " .....3.9¢

T Rail.
8 lbs. to the yard .....2.9¢ | 20 lbs. to the yard .....2.8¢
12 " " .....2.8¢ | 28 " " .....2.8¢
16 " " .....2.8¢ | 30 " " .....2.8¢

Splice Joints for 12, 16 and 20 ℔. Rail, 40¢ each; 28 and 30-℔. Rail, 50¢ each; 40-℔., 60¢ each.
3½ by ⅜ and ½ Spikes for 20 and 28-℔. Rail .....3¾¢
2½ and 3 by ⅜ " " 12 and 16-℔. " .....4.0¢
2½ by 5-16 " " 8-℔. Rail .....4½¢

Flat Rails.—Punched and Countersunk.
1¼ to 2 by ½ to ⅝ inch .....3.0¢
1½ by ⅜ and 7-16 inch .....3.2¢
1¼ by ⅜, 7-16 and ½ inch .....3.5¢

Juniata Nail Rods .....6.5¢
Norway Nail Rods .....8.0¢
Guard Iron, ½x⅝x⅝ and ½x⅝x⅝ .....4.0¢
Guard Iron ⅝x⅝x9-16 and ½x⅝x½ .....4.2¢
Drag Bars .....3.3¢
Dropper Bars .....3.8¢
Cylinder and Landside Iron .....3.2¢
Plow Beam Iron .....3.0¢

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.
⅝ to 2 inches, inclusive .....9½¢
1-16 and 2⅛ to 3 inches .....10½¢
¼ and 3⅛ to 4 " .....11½¢
7-32 and 4⅛ to 5 " .....12½¢
3-16 and 5⅛ to 6 " .....15½¢
5-32 inch .....20½¢
⅛ " .....25¢
Oil Well Steel Forgings .....20¢

Machinery Steel.

	Crucible	Bessemer & Open Hearth.
Ordinary Sizes, ⅜ to 2 inch Round	5¢	3½¢
5-16 and 2⅛ to 3 inches	6¢	4½¢
¼ and 3⅛ to 6 "	7¢	5½¢
7-32 inch	9¢	7¢
3-16 "	11c	9¢

Square, Flat and Octagon, ½¢ extra throughout the list.
Cut to specified lengths, ½¢ extra.

Hammer Cast Steel.
Crucible Cast Steel .....6¢
Open Hearth Cast Steel .....5¢

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	11¢	10¢	8¢	½¢

1¢ extra for each additional gauge.
Cut to multiples or specified lengths, ½¢ extra.

Miscellaneous Cast Steel.
Auger and Auger Bit .....5¢
Axle Steel for carriages and wagons .....5¢
Frog Points and Plates .....6¢
Frog Side Bars .....5¢
Pick, plain (hammered) .....6¢
Pick and Mattock, beveled (rolled) .....6¢
Skate Steel .....6¢
Table Cutlery, plain .....5¢
Table Cutlery, beveled .....6¢
Pike and Cant Hook .....7¢
Coal and Granite Wedge .....7¢
Roller .....7¢
Spindle, subject to Machinery classification .....6¢
Trap Spring Steel .....8¢
Forged Crank Pins and Lathe Spindles .....7½¢
Piston Rods, plain .....6¢
Piston Rods, forged to shapes .....7½¢
Slide Bars, plain .....6¢
Slide Bars, forged to shapes 7½c

Open Hearth or Bessemer
Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick .....4¾¢
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick .....6¢
Circulars and semi-circulars, when ordered separately 7c
Smoke Stack, to shape .....6¢
Locomotive Tank Steel .....5¢

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8-inch and over .....5¢
Mill Saw, 8-inch and over .....6¢
Taper, 3½-inch and over .....7¢
Horse and Shoe Rasp .....6¢

Spring Cast Steel. .....5¢
Spiral, Taper, cut to lengths .....6¢

Tire Cast Steel.
1x¼ and over .....7¢
1x3-16, ⅞x3-16 and ¼ .....7½¢
1 and 13-16x⅛ and 5-32, ¾x3-16 and 5-32 .....9½¢
¾ and ⅝x⅛ and 3-32 and 12 g .....10¢
Solid Safe Cast Steel .....6¢
Three and Five Ply Cast Steel .....8¢

Agricultural Implement Cast Steel.
Fork and Rake, Crucible .....5¢
Horse Rake Steel, cut to lengths, Crucible .....6¢
Hoe, Crucible .....6¢
Corn Stalk Cutter, beveled .....5¢
Beveled Hoe and Shovel Steel in Bars .....5¢
Crucible Plow Steel in Slabs .....5¢

Bessemer and Open Hearth.
Spring .....3½¢
Spring spiral and taper, cut to lengths .....4¢
Tire, 2-16 thick and above .....3½¢
Toe Calk .....3½¢
Plow .....3½¢
Axle Billets .....3½¢
Sleigh Shoe .....3½¢
Cutter Shoe, cut to lengths and tapered .....4½¢
Scythe Back Steel .....4¢
Grain Drill Bars .....4¢
Grain Drill Points .....5¢
Rolling Coulter Blanks, cut and punched .....9½¢
Thrasher Steel .....4¢
Thrasher Teeth .....5½¢
Rolled Hammer Billets .....4¢

Terms.—Four months; 3 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.
Furnace Floor and Straightening Plates .....1½¢
Housings and Castings not otherwise specified .....2½¢
Guide Plates .....3¢
Spindles and Coupling Boxes .....2¢
Sand Rolls and Pinions, large size .....2½¢
Sand Rolls and Pinions, small size .....3 ¢
Pipe Mill Castings .....5 ¢
Rolling Mill Castings under 50 ℔ .....4 ¢
Spur and Bevel Wheels, large .....4 ¢
Spur and Bevel Wheels, small .....4½¢
Pulleys up to 30 inches .....4½¢
Pulleys over 30 inches .....4 ¢
Engine Castings, light .....4½¢
Engine Castings, heavy .....4 ¢

Chilled Rolls.
6 to in. diam., to 20 in. long .....4 ¢
8 to 15 in. diam., 8 to 40 in. long .....4 ¢
25 to 24 in. diam., 15 to 72 in. long .....3½¢
14 to 31 in. diam., 72 to 108 in. long .....3½¢

After October 1, 1881, no discounts will be made at settlement, as heretofore, prices quoted being net.

White and Red Lead.
Strictly Pure White Lead in Oil in kegs, 6¼¢; in 25 ℔ Tin Pails, ½¢ ℘ ℔ over keg price; 12½ ℔ Tin Pails, 1¢ ℘ ℔ over keg price; assorted, 1 to 5 ℔ cans, 3¢ ℘ ℔ over keg price.
Dry White Lead in barrels .....6½¢
Red Lead, very brilliant, in kegs and barrels .....6¢
Litharge (Potter's Lead) " " " .....6¢
Freights equalized with all points where White Lead is made.
Terms: Note at 60 days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.
Discount, 60&20 % *on Single Strength*, 70&5 % *on Double.*
Prices current, ℘ box of 50 feet.

Single Strength.

United Inches	Sizes.	AA.	A.	B.	C.
25	6 x 8 to 10 x 15	$8.75	$8.00	$7.50	$7.00
39	11 x 14 to 15 x 24	9.25	8.50	8.00	7.25
48	16 x 24 to 20 x 28	10.75	9.75	8.75	7.75
54	15 x 34 to 24 x 30	12.25	10.75	9.00	....
60	26 x 28 to 24 x 36	13.00	11.50	9.75	....
70	26 x 36 to 26 x 44	14.50	13.25	10.75	....
80	26 x 46 to 30 x 50	15.00	14.00	11.25	....
84	30 x 52 to 30 x 54	....	....	....	....
90	30 x 56 to 34 x 56	....	....	....	....
94	34 x 58 to 34 x 60	....	....	....	....
100	36 x 60 to 40 x 60	....	....	....	....
	Double Strength.				
25	6 x 8 to 10 x 15	13.25	12.25	11.25	10.50
39	11 x 14 to 15 x 24	14.50	13.25	12.50	11.25
48	16 x 24 to 20 x 28	17.25	15.75	14.00	....
54	15 x 34 to 24 x 30	19.75	17.25	14.50	....
60	26 x 28 to 24 x 36	21.00	18.50	15.75	....
70	26 x 36 to 26 x 44	23.25	21.25	17.25	....
80	26 x 46 to 30 x 50	24.00	22.50	18.00	....
84	30 x 52 to 30 x 54	25.75	23.25	19.25	....
90	30 x 56 to 34 x 56	27.75	25.00	21.75	....
94	35 x 58 to 34 x 60	29.25	27.75	24.00	....
100	36 x 60 to 40 x 60	33.25	30.00	27.75	....

Sizes above — $10 ℘ box extra for every 5 inches.

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hubbard, Bakewell & Co.'s Goods.
Axes, Single Bit, Lippincott .....per doz., $7.25
Axes, Single Bit, James & Co .....per doz., 6.75
Axes, Double Bit, Lippincott .....per doz., $13.00
Axes, Double Bit, James & Co .....per doz., 10.00
Drain Tools, list .....dis 20 %
Hoes, Planters' .....dis 60 %
Hoes, Scovill Pattern .....dis 60 %
Hoes, Handled, Square Eye, German .....dis 50 %
Handles, Cross Cut .....per doz., $2.50
Handles, Shovel, Bent, Bored, Riveted .....per doz., 2.25
Saws, Circular .....dis 45 %
Saws, Long .....dis 40 %
Saws, Cross-Cut, H. B. & Co., Champion, per foot net $0.30
Saws, Cross-Cut, Lippincott, Champion, per foot net $0.27
Shovels, list .....dis 20 %
Spades, list .....dis 20 %
Scoops, list .....dis 20 %

BOSTON

Reported by Bigelow & Dowse.

Anvil & Vise.—
No. 1, $5.25; 2, $4.25; 3, $3.50 each.....dis 25 %

Augers & Bitts.—
L'Hommedieu's Ship Auger.....dis 15 %
Jenning's Bitts.....dis 25 %
Cook's Bitts.....dis 40 & 10 %
Shepardson's Double-Cut Bitts.....dis 45 %
Shepardson's Double Gimlets.....dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₱ doz., $48; No. 3, ₱ doz., $60 list.....dis 20 %
Bonney's Extension Hollow Augers.....₱ doz $36.00
Pierce's Bitts.....dis 50 %
Griswold Bitts.....dis 50 %

Axes.—Blue Jacketa.....₱ doz $8.00
Dowse Handled Boys'.....dis 35 %

Ax Handles.—
Oak Extra, 31 in., No. A.....₱ doz $2.50
Oak Extra, 34 in., No. A.....₱ doz 2.50
Oak Extra, 31 in., No. B.....₱ doz 2.00
Oak Extra, 34 in., No. B.....₱ doz 2.00
Oak Extra, 31 or 34 in., No. C.....₱ doz 1.40

Axle Clips......dis 50 %
Balances.—Chatillon's.....dis 40 %

Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers).....₱ ft., 2¢
Cast Half Round.....₱ ft., ⅝, 3¢; 1⅛, 4¢
Wrought Round.....₱ ft., ⅝, 3¢; ⅞, 4¢; 1¼, 5¢
Bells.—Connel's Crank Gong, reduced list..dis 15&10 %

Bird Cages.
Japanned M. B. & D., reduced list, 1879.....dis 40 %
Brass M. B. & D., reduced list, 1879.....dis 33⅓ %

Blind Fasts.
No. 6 Fasts.....₱ C sets 6.00
Vearle Fasts.....₱ C sets 6.00
Shedd's.....₱ C sets 6.50
Blind Hinges.—Mall. Hook, 2 holes..₱ C sets 7.00

Brad Awl Handles.—
Phœnix Adjustable.....₱ doz $2.00

Bolts.—Norway Iron Carriage.....dis 75&10 %
Common Carriage.....dis 80&20 %
Eagle Carriage.....dis 75&10 %
Borax.—Refined.....₱ lb 15¢

Boring Machines.—
Eagle Upright, each.....$5.50 list } dis 50 %
Eagle Angle, each.....6.75 list }
Braces.—Barber's.....dis 40&5 %
Spofford's.....dis 50&5 %
Backus's.....dis 50&5 %

Bracket Saws.—Holly Scroll Saw.....each $2.25
Demas Lathe and Scroll Saw.....each 6.50
Bracket Saws, extra quality, to No. 5.....₱ gro. 0.75
Steel Frame, with patterns.....₱ doz 6.50
Lester.....dis 20 %
New Rogers, all iron.....dis 25 %
Bracket Saw Blades.—Griffith's pat., ₱ gross 75¢

Brackets.—
H. B. & M. Flower Pot, reduced list.....dis 1¼&10 %
Bronzed Shelf, M. B. & D., new list.....dis 50&10 %
Store Shelf.....dis 40&10 %

Butts.—Union Fast Joint.....40&10&10&10 %
Union Loose Joints.....dis 60&10&10 %
Union Japanned Acorn.....dis 60&10&10 %
Union Silvered Acorn.....dis 60&10&10 %
Union Boston Finish.....dis 70&10 %
Union Spiral Spring.....dis 25&10 %
Wrought Brass.....dis 65&10 %
Carriage Bolts.—Eagle Norway.....dis 75&10 %
Common.....dis 80&20 %

Carriage Jacks.—Climax No. 1.....₱ doz $20.00
Climax No. 1½.....₱ doz 15.00
Climax No. 2.....₱ doz 13.50
Universal.....dis 25 %
Universal No. 1.....each $2.00
Universal No. 2.....each 3.00
Universal No. 3.....each 6.00
Universal No. 4.....each 6.00
Universal No. 5.....each 6.50
Cartridges.—U. S. Cartridge Co.....dis 50&10 %

Cards.
Watson's make Horse & Curry....dis 10 % } Rev. List.
Watson's Cotton.....dis 10 % } Aug., 1883.
Watson's Wool.....dis 10 % }
Casters.—Bed and Table.....dis 50&10 %

Chain.—Traces 6¼, 10, 4, straight.....₱ pair 50¢
Traces 6¼, 10, 4, twisted.....₱ pair 55¢
Traces 7, 12, 2, twisted.....₱ pair 80¢
Coil 3-16.....₱ lb 10¢
Coil ¼.....₱ lb 7½¢
Coil 5-16.....₱ lb 6½¢
Coil ⅜.....₱ lb 6½¢
Coil 7-16.....₱ lb ¢
Coil ½.....₱ lb 5¢

Chalk.—White, Carpenter's.....₱ gross 60¢
Red, Carpenter's.....₱ gross 80¢
Blue, Carpenter's.....₱ gross $1.00

Chisels.—Hart, Bliven & Mead, Fram'g..dis 60&10&10 %
Underhill, Framing.....dis 35 %
Buck's Chisels.....dis 30 %

Coal Hods.—"Dover."—Galv'd, New List....dis 60 %
Japanned, New List.....dis 60 %

Cocks.—Brass. L. F. & Co.....dis 50&10 %
Coffee Mills.—New List.....dis 45 %
Copper Rivets.—.....dis 50 %

Cordage.—Manila, usual trade dis 1¢.....₱ lb 13½¢
Jute.....₱ lb 8½¢

Cow Ties......dis 40 %
No. 30 3 ft. No. 6 Wire, with toggle.....₱ doz $3.80
No. 35, 3 ft. No. 6 Wire, with snap.....₱ doz 4.00
No. 40, 3½ ft. No. 6 Wire, with toggle.....₱ doz 4.30
No. 45, 3½ ft. No. 6 Wire, with snap.....₱ doz 4.50
No. 50, 4 ft. No. 4 Wire, with toggle.....₱ doz 4.75
No. 55, 4 ft. No. 4 Wire, with snap.....₱ doz 5.00
No. 60, 4¼ ft. No. 3 Wire, with toggle.....₱ doz 5.60
No. 65, 4½ ft. No. 3 Wire, with snap.....₱ doz 5.80
Crow Bars.—Cast Steel.....₱ lb 7¢
Iron Steel-pointed.....₱ lb 6¢

Cutlery.—Pocket American Shear Co.'s.....dis 40 %
Butcher Knives, Wood's, Lap Bolster, Square Handle.....dis 40 %
Steak Knives.....dis 40 %
Lap Bolster, Oval Handle.....dis 40 %
Sticking.....dis 40 %
Skinning.....dis 40 %
Butcher, Common Round Handle, Wood's.....dis 40 %
Shoe Knives, Wood's.....dis 30 %
Dividers.—Cook's.....dis 25 %
Dog Collars......dis 20 %
Door Springs.—Torrey's Rod.....₱ doz $1.62
Imitation Torrey's Rod.....₱ doz 1.45
Gem Coil, new list.....dis 50&10 %
Crown.....₱ doz $1.25
Warner's.....₱ doz 2.00
Door Stops.—Thurston's.....dis 50 %
Drawer Knobs.—Thurston's.....dis 50 %
Drills.—Morse Bitt Stock.....} dis 40 %
Morse Straight Shank.....}
Emery.—Wellington Mills.....₱ lb 10¢
Walpole Emery Mills.....₱ lb 5¢
Turkish, in 10 lb cans.....₱ lb 7¢
Enameled Ware.—
Standard Mfg. Co. Kettles.....dis 50 %
Standard Sauce Pans.....dis 30 %
Felloe Plates.—Wrought.....₱ lb ¢
Files.—American File Co.....dis 40 %
Nicholson File Co.....dis 40 %
Fluting Machines.—Knox List, $4.00.....dis 25 %
Forks.—W. C. & Co. Manure.....dis 50 %
Eastern Tool Co.'s. Manure.....dis 60 %
Gimlet Bits.—
Genuine German, No. 125, 1-32 to 8-32.....₱ doz $1.00
Mierce's.....₱ doz .88
Glass Cutters.—Combination Glass Cutter and Knife Sharpener.....₱ doz $1.00
Grub Hoes.—K. P. & Co.'s No. 2, $11.50 ₱ doz. dis 50 %
Hammers.—Maydole's.....dis 15 %
Hartford Hammer Co.....dis 20 %
Hangers & Rollers.—Anti-Friction.....dis 50 %
Acme Rollers.....dis 50 %
Climax.....dis 50 %
Common Hangers.....dis 50 %
Common Rollers.....dis 50 %
Victor Hangers.....dis 33⅓ %
Victor Rail.....dis 40&10 &
Hand Screws......dis 10 %
Hatchets.—C. F. Dowse, new list.....dis 35 %
Underhill.....dis 35 %
Hay Knives.—Lightning.....₱ doz $18.00, net
Hinges.—Strap and T (new list).....dis 60&10 %
Providence Plate.....₱ lb 5 ¢
Wrought Screw Hook.....₱ lb 5 ¢
Hoes.—Eastern Tool Co.....dis 60&10 %
W. C. & Co.'s.....dis 60 %
Hooks and Staples.—Brewers (new list)...dis 60 %

Horse Nails.

	No. 6	7	8	9	
Putnam Pointed	.24	.22	.21	.20	.....5&7 %
Bridgewater	.21	.19	.18	.17	.....30 %

Ice Cream Freezers.—Packer's, new list..dis 50&5 %
Knobs.—"Norwalk." New list.....dis 60&2 %
Silver Glass.....dis 50&10 %
Silver Glass Bell Pulls.....dis 50&10 %
Lanterns.—Tubulars, No. 0.....₱ doz $7.50

Lawn Mowers.
The "Daisy," 12 in. cut.....each, $8.00
The "Daisy," 14 in. cut.....each, 8.50
The "Daisy," 16 in. cut.....each, 9.00
The "Daisy," 18 in. cut.....each, 9.50
Continental.....dis 40&10 %
Quaker City.....dis 40&5 %
National.....dis 50 %
Lead.—Sheet.....₱ lb 7¢
Pipe.....₱ lb 6¢
Locks.—Norwalk.....dis 60&2 %
Eagle Cabinet.....dis 45 %
Eagle Trunk.....dis 15 %
W. Wilcox & Co., Padlocks.....dis 45 %
Manure Forks.—W. O. & Co.....dis 50 %
Eastern Tool Co.'s.....dis 60 %
Mattocks.
K. P. & Co., Long Cutter, $16.00 ₱ doz.....dis 50 %
K. P. & Co., Short Cutter, $15.50 ₱ doz.....dis 50 %
K. P. & Co., Pick Cutter, $16.00 ₱ doz.....dis 50 %
Measuring Tapes.—Eddy's.....dis 20 %
Meat Cutters.—Miles' Challenge.....dis 30 %
Hale's (new list).....dis 40&10 %
American.....dis 25 %
Money Drawers.—Tucker's Alarm....₱ doz $22.50
Mouse Traps.—Delusion.....₱ doz 1.25
Novelty.....₱ doz
Nails......₱ keg
Oilers.—Zinc and Tin.....dis 60 %
Brass and Copper.....dis 50 %
Ox Bows.—Extra finished and varnished....dis 10 %
1¼ in., ₱ doz. pair..$7.00 | 2 in., ₱ doz. pair..$10.00
1⅜ in., ₱ doz. pair.. 9.00 | 2¼ in., ₱ doz. pair.. 12.00
Paper.—Common Tarred Sheathing.....₱ lb 1¾¢
Eagle Brand Tarred Sheathing.....₱ lb 2 ¢
Common, Dry Sheathing.....₱ lb 1¾¢
Eagle Brand Dry Sheathing.....₱ lb 2¼¢
Picks.—K. P. & Co., Adze Eye, 5 to 6 lb $12.00.dis 50 %
K. P. & Co., Adze Eye, 6 to 7 lb $13.00.....dis 50 %
Planes.
Fancy.....dis 25 %
Razee.....dis 25 %
Bench.....dis 30 %
N. Y. Tool Co.....dis 25 %
English Iron.....dis 20 %
Bailey's.....dis 20&10 %
Plated Ware.—Rogers & Bro.....dis 50 %
Pliers.—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %
Plumb & Levels.—Stanley R. & L. Co..dis 65&10 %
Pocket Knives.—American Shear Co.'s.....dis 40 %
Potato Diggers.—W. C. & Co., reduced list..dis 50 %
Eastern Tool Co.'s.....dis 60 %
Pulleys.—Acme or Excelsior, 1¼ in.....₱ doz 22¢
Acme or Excelsior, 2 in.....₱ doz 25¢
Pulley Blocks......dis 40 %
Pumps.—Union Manufacturing Co.
Iron Cistern.....dis 40 %
Iron Pitcher Spout.....dis 50 %
Copper.....dis 30 %
Rivets.—Black (new list).....dis 40 %
Carriage in 10 lb papers (new list).....dis 40 %
Copper.....dis 50 %
Razors.—Torrey's.....dis 20 %
Rules.—Stanley, Boxwood.....dis 70&10 %
Stanley, Ivory.....dis 50&10 %
Sad Irons.—Common.....₱ lb 3¢
Laundry.....₱ lb 6¼¢
Tailors' Geese.....₱ lb 6 ¢
Enterprise "Potts'".....dis 35 %
Sash Locks.—King & Hutchinson's, new list.dis 40 %
Sandpaper.—Baeder & Adamson.....dis 35 %
Sash Weights.—Patent Eye.....₱ lb 1¼¢
Saws.—Hand Saws, Disston's.....dis 20 %
Cross-Cut Saws.
Diston's, Common Tooth.....₱ foot 68¢, dis 40 %
Diston's Great American Tooth..₱ foot 68¢, dis 40 %
Boynton's Lightning Tooth.....₱ foot 45¢
M. B. & D., Hand Saws.....dis 33⅓ %
W. M. & Co.'s Circular Saws.....dis 35 %
Richardson Bros.....dis 25 %
Saw Blades.—Diston.....dis 20 %
W. M. & C.....dis 10 %
Welch & Grimth, Extra.....₱ doz $8.40
Welch & Grimth, No. 2.....₱ doz 7.00
Scales.—Fairbanks.....dis 20 %
Screws.
American Flat-Head Iron.....new list, dis 75 %
American Flat-Head Brass.....new list, dis 75 %
American Round-Head Brass.....new list, dis 65 %
American Round-Head Iron.....new list, dis 70 %
Grilley Round-Head Nickel-Plated Common..dis 50 %
Scythes.—Clippers, in boxes.....₱ doz $8.50
Shaves.—Kimball's.....₱ inch 7½¢
Watrous.....dis 25 %
Shears.—American Shear Co., new list.....dis 70 %
Shot.—Tatham's.....₱ lb 6½¢
Shovels.—O. Ames, new list.....dis 17½ %
O. Ames, other brands, new list.....dis 17½ %
Sinks.—Magee Patent.....dis 30 %
Snow Shovels......$4.00
Skates.—Union.....dis 25 %
Acme.....dis 25 %
Oxford Rink Roller.....₱ pair, $2.50
Union Roller.....dis 25 %
Stocks and Dies.—King's.....dis 10&5 %
Tacks.
Swedes Tinned.....dis 30&10 %
Swedes Iron.....dis 30&10 %
Gimp and Lace.....dis 20&10 %
Copper Tacks.....dis 30&10 %
All balance on list.....dis 20&10 %
Traps.—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 60 %
Blake's.....dis 40&10 %
Vises.—Simpson's Adjustable.....dis 25&5 %
Howard Vise Co.....dis 25 %
Prentiss'.....dis 30 %
Weather Strips.—Packer's.....₱ doz $4.50
Browne's Flexible Rubber.....dis 30 %
In 25 feet boxes: No. 1, ⅛ in. wide, ₱ yard, 10¢;
No. 2, ¼ in., 15¢.; No. 3, ¾ in., 20¢.; No. 4, 1 in., 25¢
Black Walnut Spring Weather Strips.....₱ doz $3.50
Window Springs......dis 30 %
Babcock's No. 3.....₱ gross $6.25
Babcock's No. 4.....₱ gross 4.15
Wire Cloth.—"Clinton".....₱ sq. ft 2 ¢
Wire Fence.
Washburn Painted Barbed.....₱ lb 5 ¢
Washburn Galvanized Barbed.....₱ lb 6 ¢
Wire Goods.—Gate Hooks and Eyes, &c., dis 70&10 %
Wrenches.—A. G. Coe's.....dis 60 %
Girard Mfg. Co.....dis 60&10 %
Girard Agl.....dis 70&10 %
"Always Ready".....dis 25 %
Wringers.
Novelty No. 2 for Common Tubs.....₱ doz ....
Excelsior A with Folding Bench.....₱ doz ....
Excelsior B with Folding Bench.....₱ doz ....
Novelty Set Tub, E.....₱ doz ....
Keystone, Wood Frame No. 1¼.....₱ doz ....
Keystone, Iron Frame No. 2¼.....₱ doz ....
Zinc......₱ lb 6¢

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Watt's Ship Carpenters' Tools,
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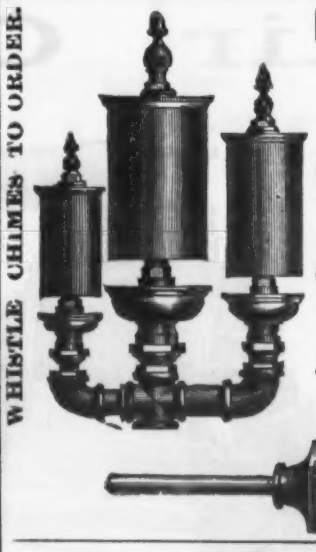

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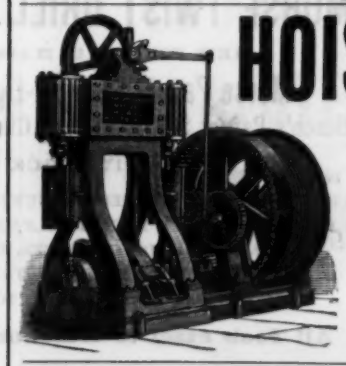

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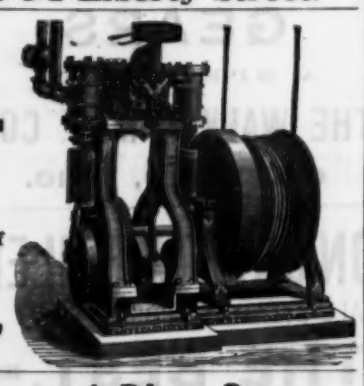

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No. 2 " "	⅛, ¼, ⅜, ½, ¾, 1, 1¼	16.00	No. 4b " "	2	2½, 3, 3½, 4 50.00
No. 3 " "	1, 1¼, 1½, 2	20.00	No. 5 " "	2½	3, 3½, 4, 4½, 5, 6 75.00
No. 3½ " "	⅛, ¼, ⅜, ½, ¾, 1, 1¼, 1½, 2	22.50			

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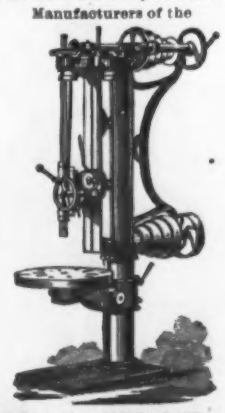

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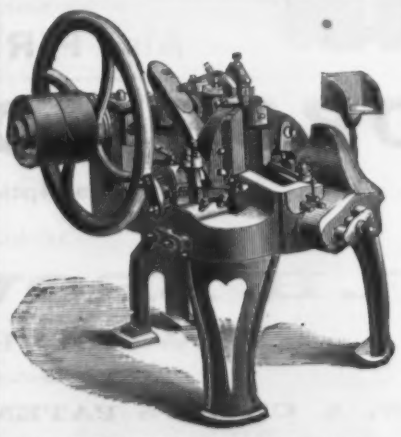

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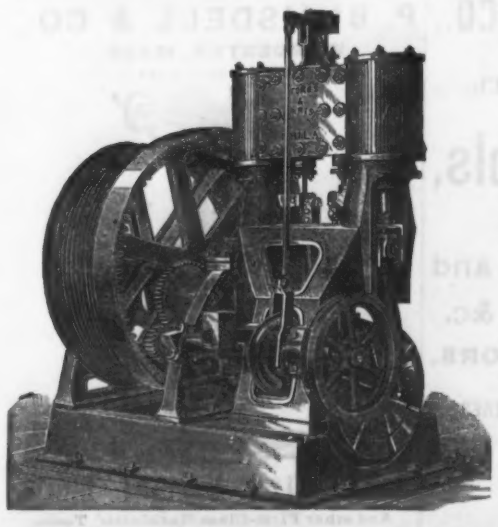

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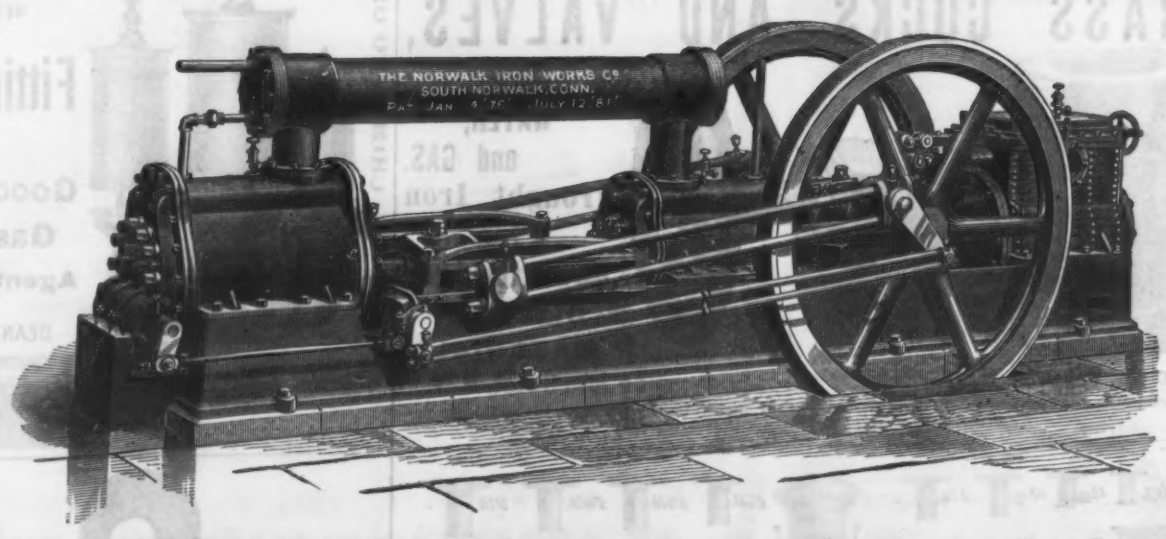

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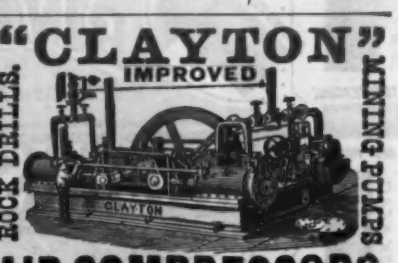

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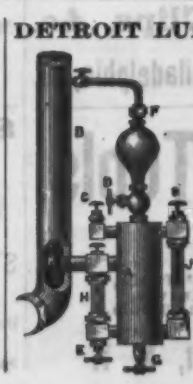

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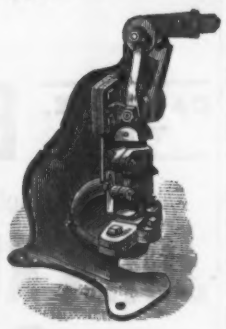

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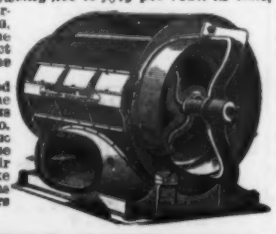

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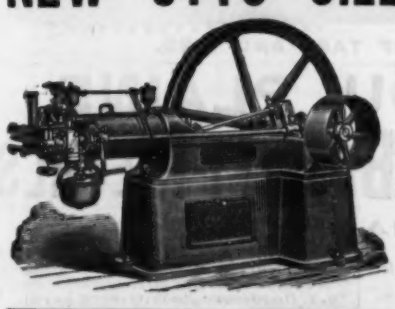

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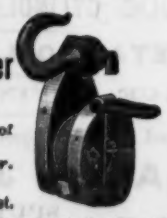

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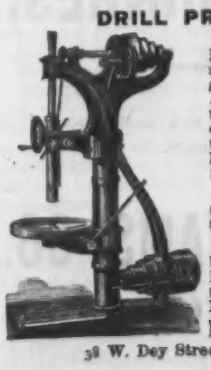

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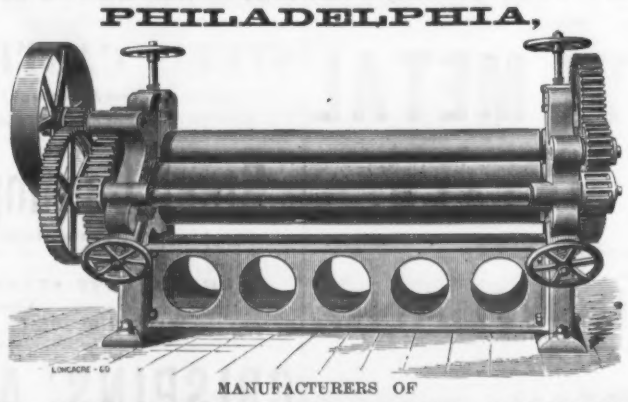

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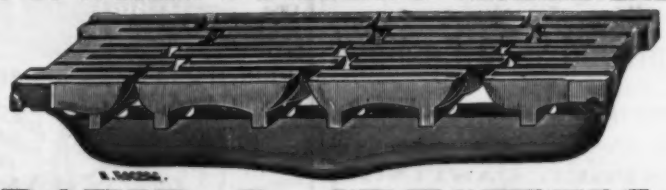

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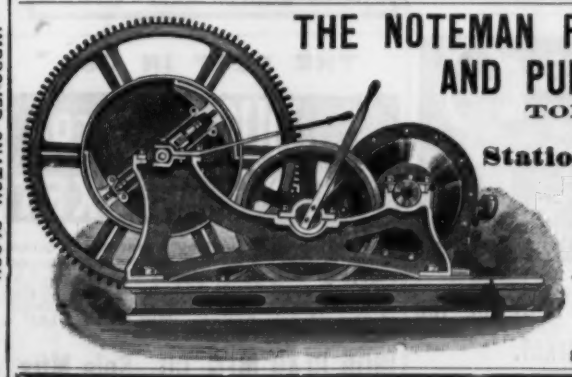

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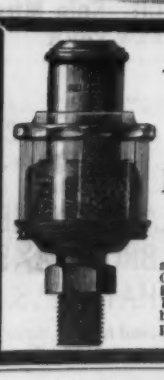

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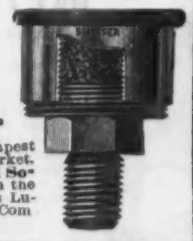

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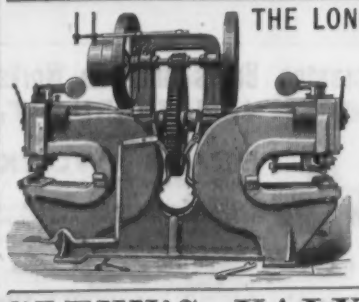

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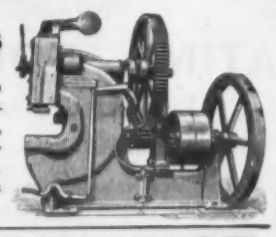

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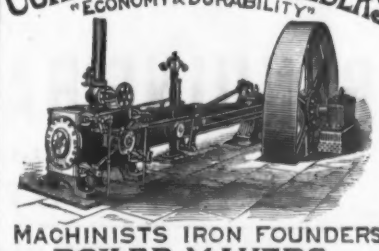

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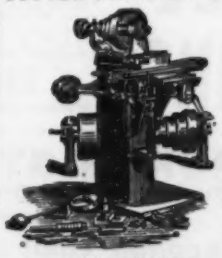

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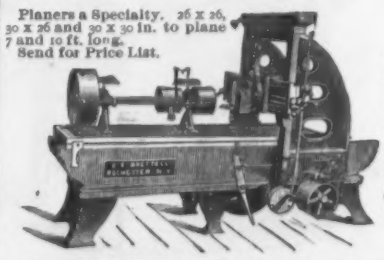

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